RESEARCH ADVENTURES IN UNIVERSITY TEACHING

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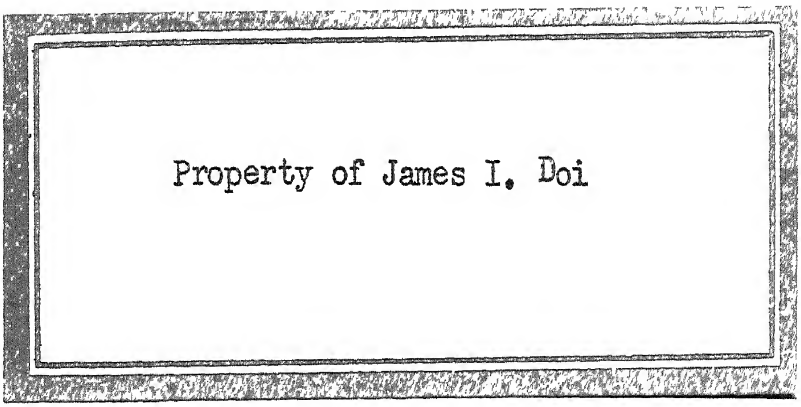
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RESEARCH ADVENTURES IN UNIVERSITY TEACHING

Eighteen Investigations Regarding College and University Problems

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PREFACE

This volume reports a portion of the results of a four year program of research regarding college and university problems. The topics dealt with are varied, involving both instructional and administrative matters, and various subjects of instruction. There are, however, three characteristics which give the total group of papers a very important unity.

In the first place the problems dealt with are all very definite, practical problems, studied because actually met in college and university work. The investigations are efforts to deal with these questions. It is believed that most of these are common and important problems of higher education. Efforts toward their solution should thus be of some general interest to college and university people.

In the second place the methods used were simple, direct, and involved little or no expense. Almost without exception the investigations are such as might have been carried on by almost any college instructor, no matter how limited the resources at his command. There has thus far been an astounding lack of research regarding problems of higher education. Further, there seems to be a tendency for college and university men to look toward the big foundations for research in this field rather than to initiate such work in their own institutions. The writer is convinced that such investigation ought to be general. Only then can the work advance as it should. Only then can the special needs of each institution be met. It is the hope that this volume may aid in demonstrating both the general need and the general feasibility of such research.

Finally it is to be added that certain of the papers in the volume are summaries of master's or doctor's theses, and that in most of the work reported in the volume students have had some part. College and university problems are not usually thought of as matter for student investigation. But after all it would seem desirable that students as well as faculty should study these questions. In fact it might be considered peculiarly fitting that this should be so, since it is the purpose of the college to serve the student, and he should be most interested in the improvement of this service and most sensitive to its shortcomings.

These student papers are, however, of significance in another connection perhaps more important. A large proportion of the

graduate students in our universities, probably a majority of the candidates for the doctorate, will teach in institutions of higher education. Nevertheless not one in a hundred such students is given any training whatsoever dealing directly with the tremendously complex problems of instructional method, administrative procedure, larger educational policy, with which he must soon struggle. There is no such thing as professional training for college and university teachers.

The writer believes that there should be such training. He believes that college teachers should have as much of a professional and research attitude toward their teaching as toward the subject matter of their specialty. It thus would seem entirely fitting and in fact desirable that students looking forward to college or university careers should have as part of their graduate work an investigation of some college or university problem. Such a series of projects might perhaps serve as a first step toward a program of professional training for college work.

The volume is thus a collection of papers dealing, by simple, direct methods, with important practical college and university problems, gathered together with the hope that it will further a professional attitude toward and research approach to these problems. It is, in fact, the hope of those concerned with this book that it may contribute toward something which is now largely nonexistent—a professional literature for college teachers.

S. L. PRESSEY

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PROBLEMS OF STUDY

The problem of study methods for efficient college work might from one point of view be called *the* major problem of the college student; it is the problem of efficiency in his job. Further, it is coming to be realized by investigators in the elementary and secondary school fields that the skills involved in efficient study are in large part clearly definable, and can be developed with some readiness by proper training. It would seem reasonable to suppose that this problem, as it appears in normal school, college, or university, might similarly be analyzed, and be dealt with constructively.

This first section presents certain investigations attempting thus to deal, in a practical and a constructive way, with this whole subject as it appears in higher education. The first paper reports efforts to determine, by very simple and direct procedures, just what specific study methods actually do "work" in college. The last two show constructively what can be done in the way of educational rehabilitation of college students who are doing poor work. The importance of these last articles must be emphasized. They clearly suggest that many students who fail do not fail because of lack of innate ability; they fail because of certain maladjustments of previous preparation, emotional attitude, or methods of work, to the college situation—maladjustments which are comparatively easily dealt with once they are understood. Regarding a majority of these students it might better be said that not the student but the college has failed—has failed to do anything in a fundamentally constructive way for those students for whom it might have done most. The situation suggests a responsibility—and an opportunity—which would seem to merit very careful consideration by college authorities. As will be pointed out in the summary at the close of this section, there appear to be, here, very interesting possibilities for a constructive policy of great educational potentialities.

I

WHAT ARE THE CRUCIAL DIFFERENCES BETWEEN GOOD AND POOR STUDENTS?

LUELLA COLE PRESSEY

For the past five years the writer has been carrying on a series of investigations aiming at the determination of the important factors contributing to success or failure in college work. Certain of these investigations have been largely informal in nature and incidental to teaching, contacts with students in social or athletic activities, administrative work concerned with the enrollment of students and counseling with those in academic distress; it appeared profitable to attack such a complex problem from many angles, and occasionally in indirect fashion. Other studies were more closely systematic in method, and dealt directly and obviously with the matter. The present paper reports two investigations of this latter type. Though subject to obvious criticisms, they involved certain important considerations regarding method. And they will serve very well to show not only the great variety of factors influencing a student's work in college, but also the substantial agreement of these investigations in pointing to certain relatively few of these factors as outstandingly important.

The first section summarizes an effort to deal with the problem intensively by a personal interview and case study procedure.[1] The second section describes results of a class inquiry method. In both instances it will be observed that two contrasting groups have been considered—a group of students who were successful academically, and a contrasting group of those painfully below average in achievement. This procedure is the first point to be noted. Those who have done previous work in this field have usually investigated simply poor students *or* good students—and it has been assumed that any features discovered to be fairly general in the group studied were important causes of the success or failure of that group. As a matter of fact no such inference is under such circum-

[1] This section gives in very brief form results of a study made under the writer's direction by Mrs. Helen Corbett Martin; it is hoped that Mrs. Martin may publish later a more complete account with further data. Miss Mona Rogers assisted in the second investigation.

stances warranted; the characteristic in question may be equally prominent among both good *and* poor students.[2]

Study of Good and Poor Students by the Interview Method

The purpose of this preliminary investigation was to find, by as wide range and as intimate inquiries as seemed possible under the circumstances, any clues which might lead to some further understanding of the factors making for college success or failure. Twenty-five "A" and twenty-five "E" students were selected for investigation, from classes in educational and elementary psychology. The two groups were made up of cases roughly paired as to year in college and intelligence. Investigation of these two groups should thus indicate something as to methods of study or analagous factors (factors other than simply intelligence or academic experience) operating to condition academic achievement.[3]

The interviewer (Mrs. Martin) now had an extended personal interview with each one of these fifty students, regarding his work. She began by asking the student either what his difficulties were or—if he were one of the "A" group—to what factors he attributed his success; the effort was to give the student opportunity to express himself in his own fashion. Under such circumstances, classification of replies was naturally difficult. The following summary table

TABLE I

	No. "A" students	No. "E" students	Difference
Interest in subject	18	4	14
Extra hard work	14	2	12
Too slow in reading	1	9	−8
Lack of study	1	9	−8
Lack of vocabulary	0	8	−8
Poor habits of study	0	9	−9

indicates the general nature of the findings. The first column shows the number of "A" students volunteering any reason, the second column the number of "E" students giving the

[2] So one of the investigations here reported showed that the good students usually took fairly full notes on their reading. It might have been inferred that these full notes helped make them good students. However—it was found that the notes of the poor students averaged as of about the same length; mere length of notes seems to be an item of little real importance.

[3] That is, academic achievement as indicated by marks; marks are, of course, not always an indication of the student's real mastery of his work; thus the instructor may grade too much on mere memory work, mere regurgitation. But the method does deal directly with efficiency as the college measures it.

same reason, while the third shows the differences—a minus sign indicating an excess of "E" students.

Evidently the preceding table is not very helpful; however, certain general factors do appear.

Inquiry next made, as to the way students went about their reading assignments, showed the following results:

TABLE II

	"A" students	"E" students	Difference
Reading once carefully, re-reading, and taking notes	12	1	11
Reading summary, skimming, then re-reading, and taking notes	9	1	8
Reading hurriedly, taking few notes	4	14	−10
"Going over and over" the material	0	9	−9

The most conspicuous feature is the following out of some system by the "A" students, in contrast to the lack of any system on the part of most "E" students. Questioning as to frequency of reviews showed 19 of the "A" students reporting reviews as occurring every three weeks or oftener, while only two of the "E" group thus reported. The students were asked to tell how they took notes; and notebooks were examined and classified as follows:

TABLE III

	"A" students	"E" students	Difference
Full notes, well organized	10	0	10
Few notes, well organized	12	6	6
Unorganized notes	3	17	−14

The careful organization of material here again appeared the important factor; as has been mentioned, there was little difference in average length when the notes of the two groups were compared.

The interviewer also inquired concerning any difficulties in writing reports, examinations, or other work to be turned in. The types of difficulty mentioned were as follows:

TABLE IV

	"A" students	"E" students	Difference
No difficulty in written work	20	5	15
Difficulty due to slow writing	1	8	−7
Difficulty due to "inability to express self" in writing	0	7	−7

These responses from the students (taken at their face value) may, of course, be interpreted as meaning either that skill in written expression conduces to clear thinking and good marks, or that the greater ease of expression of good students is a product of more adequate information regarding topics written about.

The next matter touched upon was the extent to which students applied facts learned in class and thought over classwork outside of class. Briefly it may be said that 21 of the "A" students, in contrast to only 6 of the "E" students, indicated that they applied material acquired in class to topics met outside that class. And it may be added that examples of such application, and other indirect evidence, gave support to these figures.

An attempt was now made to discover factors other than study method that were related to academic success. A general statement from the students regarding their health and general physical condition was first obtained. Of the "A" students, 23 reported good health; one of the "A" students had trouble with his eyes and one did not hear well. In contrast, only 13 "E" students reported themselves in good physical condition, and a variety of more or less serious ills were mentioned. Four had eye trouble, three were "tired all the time," three had goitres, and two had diseased tonsils and enlarged adenoids. Of course, the poor students may be tempted to report physical trouble as excuses for poor work; or the poor work may cause hypochondria. From observation of the students the interviewer was inclined to believe that the "A" students were, as a group, in better physical condition than the "E" students.

Inquiry as to number and type of extra-curricular activities developed no differences between the two groups. However, ten of the "E" students were working for part or all of their college expenses, while only three of the "A" students were so working.

An Investigation by a Group Method of the Differences Between Good and Poor Students

It was found desirable, in the total effort for information regarding effective study methods and related factors affecting academic success, to obtain somewhat more extensive data about certain topics than was possible by individual methods of inquiry. On the basis of previous work a somewhat elaborate series of questions was therefore formulated, revised, finally cut to a total of 125 objective answer questions, and given to some 250 students in classes in elementary psychology. The nature of the questions will be indicated shortly. Marks of these students for the entire previous

quarter's work were also obtained, and the papers arranged in order of the average scholastic standing for the previous quarter. Elimination of students who had not been in school the previous quarter, or for whom the data were otherwise incomplete, reduced the total number dealt with in this study to exactly 200. The papers of the 50 students making the highest marks and the 50 making the lowest were then selected for intensive study, in an effort to determine what was distinctive of the good group as compared to the poor. The statistical procedure was simple. Most of the questions were answered simply by yes or no. For each question the percent of good students answering "Yes" was found, and the percent of poor students so answering; the difference between these figures then served as a rough indication of the importance of the factor to which the question referred, in conditioning academic success.

The following list includes only those questions showing a difference of 20 percent or more between the good and poor students. The percent given for each question is in each case the percent by which the poor group exceeded the good group (thus the figure after the first question of Section B shows that 36 percent more of the poor students than of the good did not usually study every day in the same place); the effort was to find the distinctive weakness of the poor students. The questions have been grouped under various main heads, so that their significance may be more easily grasped; within each section the items are arranged in order of distinctiveness.

TABLE V

	Answer	Percent
A. Physical Condition.		
1. Are you usually tired when you get up in the morning?	Yes	36
2. Do you have any chronic complaint that prevents you from doing your best work?	Yes	24
B. Study Environment and General Routine of Study.		
1. Do you usually study every day in the same place?	No	36
2. Do you have a daily plan of work?	No	24
3. Do you usually know in the morning just how you are going to spend your day?	No	24
4. Does your desk have anything on it that might distract your mind from work?	Yes	20
5. Are study hours observed where you live?	No	20
C. Reading.		
1. Do you frequently skip the graphs or tables in your textbooks?	Yes	40
2. Do you frequently make simple charts or diagrams to represent points in your reading?	No	40
3. When you find a word in your reading that you do not know do you usually look it up in the dictionary?	No	32

	Answer	Percent
4. Do you usually skim over a chapter before reading it in detail?	No	28
5. Do you usually have trouble in getting the meaning of a chart or table?	Yes	28
6. Do you usually glance through a chapter looking at the paragraph headings before reading it in detail?	No	24
7. Do you usually read the summary at the end of a chapter before reading the chapter?	No	20
8. When you memorize something do you usually do it all at one sitting?	Yes	20
D. Note Taking.		
1. Do you keep your notes from one subject together..	No	32
2. Do you usually take your notes in class just as rapidly as you can write?	Yes	32
3. Do you usually take your notes in lecture in outline form?	No	28
4. Do you usually take your notes on reading in outline form?	No	28
5. Do you usually summarize your readings in a sentence or short paragraph?	No	24
6. After you have read a chapter and taken notes on it do you usually write a summary of the chapter as a whole?	No	24
E. Self Expression.		
1. Do you usually have difficulty in expressing yourself in written work?	Yes	56
2. Do your teachers frequently complain that you do not make sentences when you write?	Yes	28
3. Do you usually have difficulty in making complete sentences when you write?	Yes	28
F. Examinations and Reviews.		
1. Do you sit up late the night before an exam studying?	Yes	40
2. Do you often write the answer to a question only to find that it is the answer to some other question on the examination?	Yes	32
3. In preparing for an examination do you try to memorize the text?	Yes	28
4. If a teacher gives an examination without warning do you usually fail it?	Yes	24
G. General Attitudes.		
1. Do you frequently try to analyze your work and find out just where you are weak?	No	36
2. Do you frequently use the facts learned in one course to help you in the work of some other course?	No	28

The above table is essentially self-explanatory; no detailed comments seem necessary. It will be noted that the findings are largely (in so far as the same topics are covered) in agreement with findings mentioned in the previous section.

The Significance of the Findings

The limitations of the data in the two preceding sections are obvious; in particular there is this weakness, that the results have to do with what the students *say* about their work rather than with

observation of what they actually do. However, the writer's rather unusual opportunities for such observation (as mentioned in the introduction to this paper), and other more objective studies, lead her to believe the findings largely indicative of the important features of the situation.

The constructive possibilities of the situation as thus outlined remain to be stressed. Eye troubles can usually be remedied. Graph reading, the mechanics of English composition, schemes for outlining—such things can be taught. And one gains the impression that, by careful analysis of study difficulties and remedial work directed against each one, real help might be given to students in academic distress. That such help, based on such analyses, can be made of proven effectiveness, will be shown in the following paper.

Summary

The paper summarizes two exploratory investigations which were part of a general program aiming at the determination of factors involved in academic success. The first study dealt with differences found by a personal interview method, between 25 "A" and 25 "E" students. The second study was concerned with differences, between the 50 best and the 50 poorest students in a group of 200, appearing on a questionnaire dealing with methods of work and circumstances which might affect academic efficiency. The findings of the two investigations were largely in agreement, and suggest the following conclusions:

1. A distinctly greater number of poor than of good students report physical handicaps or poor health.
2. More of the poor than of the good students are earning their way, wholly or in part, during the school year.
3. Poor students lack a routine of work; they do not plan their time or have any regular work habits.
4. Poor students fail to read selectively and to make use of reading aids, such as topic headings, summaries, graphs; they also make less use of the dictionary.
5. Good students are distinguished by the greater systematization and organization of their notes, in both reading and lecture.
6. Good students review more often, and in particular they review selectively with reference to weak spots instead of going over all material indiscriminately.
7. Poor students are frequently deficient in the mechanics of English composition.

II

A CLASS OF PROBATION STUDENTS

LUELLA COLE PRESSEY

HISTORY OF THE UNDERTAKING

The writer has, throughout her university teaching experience, made an effort to come to some personal acquaintance with, and understanding of, her students. In proportion as she has achieved such acquaintance and understanding she has been impressed with the discrepancy between the complexity and the very human character of the problems presented by each student, and the routine and set methods of dealing with these students employed by almost every large college and university.

This discrepancy seemed most painfully apparent in the case of the failing students. The average school has a set method for dealing with such students; it puts them on probation and threatens dismissal. But the causes of failure are usually complex and various. The question naturally arises—could not some method of dealing with probation students be devised which involved more insight into the problems presented by these cases, and had more constructive possibilities? This paper describes the results of an effort at such a development. The effort was to organize a class to which probation students could be sent and in which they could be "diagnosed" and educationally rehabilitated.

Such a class was first offered some three years ago. Gradually, methods and policies have been developed. The present paper deals with this course—and its efficacy—as offered in the winter of 1926.

THE PERSONNEL OF THE CLASS

The class (in 1926) consisted of 31 students—17 Freshmen, 12 Sophomores and 2 Juniors (all but four in the College of Education). With one exception these students were taking the course on the advice of the secretary of the college (an arrangement was made with the secretaries that they should recommend to the class students needing help—and whom they considered not entirely impossible to salvage). All but six were on probation, and these six were below the standing required of students at the end of their third year—so far below, in fact, that it seemed rather un-

likely that they would be able to pull up their work by their own efforts to the required standard.

The record made by these students during the quarter previous to their admission to the course will make clearer the seriousness of their academic difficulties. The following table shows first the total number of hours of A, B, C, D and E received by the entire group in the work of this quarter (in this table marks in physical education and military training have been omitted).

TABLE VI

Mark	A	B	C	D	E	Total	Points	Ratio
Hours	0	14	97	98	238	447	334	.75

Thus it appears that these 31 students managed to fail 238 hours of college work during the preceding quarter; 8 students failed everything they were carrying, and there were only two students who did not fail something. The total of points (each hour of "A" work being counted 4, each hour of B counted 3, each C weighted by counting it as 2, D's being 1 and E's zero) is followed by the point hour ratio. This is $^{33}/_{447}$ or .75, for the class as a whole. Since a D is equal to 1, it is evident that the standing of the class was below passing, on an average. The university requires a point-hour ratio of 1.7 at the end of the junior year and 1.8 for graduation.

The standing of the group in intelligence, as measured by the university tests, remains to be mentioned. The results from this test classify the students into five groups: Group I includes students with percentile rankings from 95 to 100; Group II, from 75-94; Group III, from 25-75; Group IV, from 5-24; and Group V, from 1-5. The 31 students of the class were distributed as follows: In Group I there were 2 students; in Group II, none; in Group III, 14; in Group IV, 11; and in Group V, 4. The median falls at the bottom of Group III, at the 25th percentile, to be exact. It can be seen at once that the majority of these failing students were in Groups III and IV—but by no means can it be said that the group as a whole was mentally inadequate. It seemed evident that most of these students were not failing simply because of lack of ability.

From the foregoing data it is clear that this class was made up, for the most part, of students who were a little below the college average in intelligence, and were doing very unsatisfactory college work. The question was as to what might be done for the educational rehabilitation of such individuals.

Nature of the Treatment

The course consisted of (a) one interview each week, (b) one lecture, (c) one two-hour laboratory period and (d) such drill work and other remedial measures as seemed necessary in individual cases. There were also, each week, reading assignments in various books on how to study, chapters in texts in psychology on such topics as learning and memory, articles in educational journals dealing with college students and their problems. During the interview hour an earnest effort was made (by means of questions, tests, observation of methods of work, or whatever other procedures might seem applicable) to get at the sources of each student's difficulties, and to guide the student in his attempts at remedying his difficulties. During the lecture hour the class was given explanations concerning effective methods of work and other information which might be of aid to the group as a whole. In the laboratory hours on the day following the lecture the groups carried into actual practice the suggestions given them in the lecture. The individual work varied all the way from special drill in decimal fractions (for a student strikingly deficient in this subject and taking chemistry) to consultation with a specialist regarding treatment for thyroid insufficiency. A more detailed account of each of these four lines of work follows:

The Interviews: The first one or two interviews were spent in getting acquainted with the student and obtaining a case history. Special emphasis was put upon the student's own story of his difficulty, and as complete a history as possible was obtained of the student's career since entering the university plus such facts regarding his high school history and home life as seemed relevant. During the following three or four hours, tests were given to discover any special weaknesses in the "tool" subjects.[1] The results of these tests were made into a simple chart, which was shown to the student, and usually became one point of departure for the individual work to be described shortly. The next two or three interviews were devoted to an investigation of courses now being taken with which the students were having difficulty. The last two interviews were spent in retests in the "tool" subjects to determine whether the student had, in his drill work, made up deficiencies.

[1] The following tests were used: Monroe Revised Reading, Ayres Spelling, Willing Composition, Pressey Diagnostic Tests in Composition, Ayres Gettysburg Handwriting, Monroe Diagnostic Arithmetic, and McClusky Study Outline Tests.

The interviews indicated that the factors listed below were the most important in causing the educational difficulties that led to the appearance of students in this class. These elements have been divided into (1) Defects of Study Method and Preparation and (2) Background Conditions. The number following each item shows the number of students in whose cases the factor was an element. The figures total more than 31, the number in the class, because most of the students showed more than one factor operating.

(I) *Defects of Study Method and Preparation.*

No planning of written work, especially examinations (questions answered by "free association")	18
Unintelligible notes	17
Marked inferiority in mechanics of English composition	17
Markedly inefficient reading	17
Inadequate and unsystematic reviews	16
Inability in outlining	13
Inferiority in arithmetic	13
No system in work	11
Illegible handwriting	8
No understanding of phonics	4

(II) *Background Conditions.*

Low intelligence	8
Poor health	7
Panic from fear of failure	6
Outside work	5
Too much exercise (physical education students)	5
Social isolation	4
Lazy	4
Too much social life	3
Psychopathic personality	3
Vocational maladjustment	3
Feelings of inferiority	2
"Too much family"	1

It is to be noted, regarding defects of preparation, that deficiencies in high school preparation do not seem to be an important fact in any case. In fact, the writer has come to the rather astounding conclusion that it is primarily the elementary school preparation in the tool subjects that conditions college work and that the high school training is of little importance. Nevertheless, college entrance policies stress high school records (which in this study appear to be both unimportant and unreliable) and neglect elementary preparation entirely.

The Lecture Hour: There were eleven weeks to the quarter and thus eleven lecture hours. The main subjects dealt with were efficient methods in reading, methods of outlining (both from textbooks and lectures), efficiency in English composition, organization and presentation of material in answering examination questions, and

mental hygiene.[2] That is, the lectures presented such material as the interviews, and previous investigations regarding efficiency in college work, suggested would be of value to all the students in the class. The "lecture" was also the time when the readings were assigned and discussed.

The Laboratory Period: During this period the students brought their textbooks, notebooks and other materials with them and studied under direction. They were given some idea of the experiment to be carried on at a particular laboratory period, during the lecture hour the day before; on coming into the laboratory they received slips giving them more specific directions. Every effort was made to carry on the work in such a way that the students could get an objective check on the different methods they were using, and thus come to an intelligent decision as to what method was most effective for them.

The general nature of the laboratory experiments is indicated by the sample periods described below:

1. Getting the author's outline. Students began by turning the main headings of a chapter into questions, and putting each question at the top of a sheet of paper. The chapter was then read in detail, the notes under each main heading being put on the appropriate sheet. When all notes had been taken, the books were closed, and the students wrote at the bottom of each sheet an answer to the question at the top, using the intervening notes as aids. The sheets were then arranged so that only the questions at the top showed, and the students tried answering each question to themselves, checking their answers by looking at their written work. As each question was correctly answered the sheet was discarded, and the student concentrated attention on what remained.
2. Practice in eye movements. The students practiced fixating each line of some simple story three or four times. They did not try to get meaning, but simply practiced a rhythmic and long, even, swing of the eyes across the page. They checked each other by watching the eye movements in a

[2] Some readers may be surprised at the relatively small amount of space devoted to this last topic. The fact was that this group of students presented (as was clearly indicated in the interviews) chiefly educational—not emotional—problems. To be sure, many of them presented a clinical picture of emotional disturbance at the beginning of the course, but events proved their own naïve statement that they were worrying because they were failing to be essentially correct; they were not failing because of worry from some matter extraneous to their college work. Under the circumstances it was felt that a direct drive at the source of the educational difficulties, with comparative neglect of emotional disturbances, would be of greater value than a reverse order of emphasis. Of course some students suffer from fundamental emotional maladjustments. But the writer believes that the number of probationers whose difficulties trace back to such a source has been over-estimated. Such cases are, perhaps, more likely to be disciplinary problems.

mirror. After they had learned the right movements, they proceeded with the story, picking up as much meaning as they could. When they were getting the meaning with such regular and not too frequent fixations, they went on to somewhat harder reading. At the beginning and end of the practice periods rough tests were given to show the increase in rate of reading, and the amount of comprehension at the different rates of speed.[3]

3. Reviewing for examinations. Each student brought in a large cardboard, about 18 x 24. He brought also all the material he would use in reviewing some one course—textbook, notebooks, laboratory notes, outside reading notes, etc. He first selected not more than 10 main topics with which the course had dealt. On the cardboard he outlined the entire course to date, using question form for the headings, and getting his material from all sources. At the end of the period the entire course—that is, all that was sufficiently important to be reviewed—was expected to be on the card. In any remaining time the student was to overlearn the main headings.
4. Making a rapid initial survey of a chapter. The student selected an unread chapter from a text. He then read the summary, if there was one—the introduction, and the paragraph headings. He next made a brief survey outline of the chapter, so as to get the main ideas properly related to each other (he left room on the outline for filling in details). During the two hours he practiced surveying five chapters, in this manner. Each chapter was allowed twenty minutes.
5. Organizing and writing a topic. Each student brought to class a pack of 3 x 5 library cards on which he had taken notes from three different chapters on how to memorize. Each note was taken on a separate card. The student first decided on what he would call the main heads of his paper and laid these cards out on the table; he then dealt his other cards onto whatever pile he thought would be appropriate. After his general classification of points had been checked, he took each pile and arranged the cards in the form of an outline, showing exactly how his outline would look on paper. If he desired, he copied his outline from the cards, or if he preferred, he simply numbered the cards so that he could get back his outline by rearranging them whenever he wished. When all sections of the paper had been arranged, the student wrote his paper from the outline thus obtained.

It is probably evident that in general the laboratory periods carried out and emphasized the points brought out in the lectures. They afforded the student practice. In another giving of the course the author would advise having two laboratory periods each week so that correct habits of work could be more adequately ingrained.

[3] The training given in this period may seem unusual. But it is in accordance with research regarding the "mechanics" of reading, and it yielded results; speed of reading was in most cases distinctly increased. Many of these students had been reading in the laborious word-by-word fashion of a child. The practice helped to break this habit, and get them started toward the phrase and thought-unit reading of the good adult reader.

Individual Treatment: The type of individual work that affected the largest number of students was concerned with the remedying of the defects in elementary school preparation. That such drill was necessary was evidenced both by observation of the student's work and by the test results summarized below. The average number of students rating below eighth grade norms on these various tests was 16; four students were below in every subject, four more in all but one, and no student was at or above the eighth grade norm on all tests.

The method of dealing with this situation was direct and simple. Each student was required to spend an hour per week on remedial practice in each subject in which he was below eighth grade standing, and to continue this drill as many weeks as necessary to bring up the work to this required level. Such materials as the Courtis practice tests in arithmetic were used, in subjects in which such exercises were available. Otherwise, informal drill exercises were used. The results may be summarized briefly in this statement, that the testing at the end of the quarter showed an average of only three students below the eighth grade standard.

The following table will show the situation in more detail. Under each subject the first column shows the standing at the beginning of the quarter, and the second column the status at the end, as indicated by the second testing.

TABLE VII

Grades	Arith.		Read. (speed)		Spell.		Writing.		Cap.		Punc.		Gram.		Sent. Struct.	
8 or above	1	27	17	29	24	29	12	29	16	30	20	25	20	29	18	29
7	6	2	3	1	2		2	1	7		6	3	5	2	10	1
6	13	1	4	1	4	1	3		7	1	4	2	5		2	1
5	7	1	5			1	4	1	1		1	1	1		1	
4	4		2		1		2									
3							1									
2							7									

There were a variety of other types of individual treatment and adjustment. Two students were given very complete physical examinations by an expert diagnostician, and two others were given less complete examinations by a good general practitioner. Two students were removed from some of their gymnasium classes so as to give them time for a much needed rest. Three other students were persuaded to drop outside work so as to relieve strain.

At the very end of the course, each student was given a typewritten card on which appeared a summary of his case, with a

warning as to his weaknesses and some advice concerning his remaining time in college—courses, living conditions, friends, health, etc. These cards were intended to give emphasis to previous treatment, and to serve for future guidance.

As may be now realized, the "treatment" given these students was distinctly strenuous! They put in four hours a week under direct supervision of the author or her assistants, had reading assignments, outlines, and other related work to prepare outside of class, put in as many drill hours as they needed to bring their standing in the "tool" subjects up to the required level, spent time on other features involved in the individual treatment. In only one or two cases was there any protest against the regime. In general, the students were eager to avail themselves of the help given them; most of them saw the relevance of the work they were doing in the course to their other college classes, and coöperated to the best of their ability. In fact, the author sees no hindrance to increasing the amount of laboratory work without arousing any antagonism on the part of the students.

The Results of the Course

The natural way to measure effects of such a course is, obviously, to find out whether the members of the class do better in their college work in consequence. At the close of the winter quarter (the quarter when this course was given) all the marks made by these 31 students were obtained, with the exception of marks in physical education and military science. These marks are presented below, with the marks obtained in the previous (autumn) quarter to make clear any changes.

TABLE VIII

Marks	A	B	C	D	E	Total	Points	Ratio
Autumn Quarter	0	14	97	98	238	447	334	.75
Winter Quarter	27	94	179	79	49	428	827	1.93

The average number of hours being carried by each student was 14.4 for the previous quarter and 13.8 for the winter quarter, so that the advance in standing is not due to having a markedly lighter load. The point hour ratio for this second quarter for the whole class is 1.93, or almost a C standing, in place of being below a D average as for the previous quarter. Three of the students failed to pass enough of their work to remain in college; one got into a "row" with an instructor, and failed an important course and had to leave; a fifth student was "out under rules" because of a technicality. Of the 31, 26 succeeded in getting off probation.

The figures surely suggest that the students were definitely helped by the course. It might be argued, however, that the gains were due, wholly or in part, to the being on probation.[4] To check on this factor the class was compared with a control group of probation students from the previous year, who had not received any remedial treatment, and whose intelligence rating was the same as for the students who took the course. Thus, each student was paired with a probation student from the year before—or if the student in the course was not on probation, he was paired with a student who was also below the point-hour ratio, though not actually on probation at the time, The standing of this control group for the quarter preceding their probation was as follows:

TABLE IX

A	B	C	D	E	Total	Points	Ratio
3	12	105	90	242	452	348	.77

The average load by this control group in the autumn quarter was 14.6 hours and the point hour ratio .77 as compared with 14.4 hours and .75 for the group with which the writer worked—the groups were thus initially very similar. However, the students in this control group received no remedial treatment. At the close of their probation quarter they had gained the following marks:

TABLE X

A	B	C	D	E	Total	Points	Ratio
3	15	113	118	135	384	401	1.04

[4] Two other factors possibly influencing these gains deserve brief comment. In the first place some of the higher marks obtained in the winter quarter might be marks in the "How to Study" course itself—supposing the grading in this class had been somewhat lenient (and this would be only natural, in a class composed only of "poor" students). The marks in the course were therefore examined, with this possibility in mind, and the winter point-hour ratios calculated with the marks in this course omitted. The marks in this course did average slightly higher than the average of the marks in the other courses; however, omission of marks in this course drops the point-hour ratio only .05—a figure relatively negligible compared with the total gain from autumn to winter.

The second point to be considered is this, that in the winter about one fifth (88 hours) of the work these students were taking was a repeating of courses previously failed; it would surely be expected that in going over a course a second time a good mark would be obtained. Instead, when the repeated work is taken out of the above figures, the point-hour ratio proceeds to rise from 1.93 to 2.0. Evidently, a student is more likely to fail a course if he has already failed it once than if he has never taken it before. In fact, 30 of the 49 hours of E received during the winter quarter were on repeated work. This result leads one to wonder if the usual method of simply making a student take over a course that he has failed—without giving him any effort to understand and correct the original difficulties that caused him to fail in the first place—can be considered a particularly profitable (or intelligent) way of dealing with the situation.

The average load was 12.4 hours—or somewhat less than that carried by the writer's group—and the point-hour ratio was 1.04, or an increase of only .27 over the standing of the previous quarter. The "How to Study" class gained 1.18 over *their* previous standing. It would seem reasonable to conclude that the marked additional gain of the experimental group was due to the course, since other factors seem so largely negligible.[5]

Recently obtained evidence that the students who took the writer's course continued, during the quarter after the course was taken, to profit by it, is very important confirmation of this conclusion. The following table shows the important facts.

TABLE XI

	Experimental Group	Control Group
Still in college	22	14
No. "out under rules"	3	11
No back on probation	4*	6*
No. "out" for other reasons	6	6
Av. No. of hours taken	14	13.4
Av. point-hour ratio	1.74	1 43

* These students are included in the number "still in college."

It will be noted in the first place that almost twice as many in the control group as in the experimental group have left college; over three times as many have been eliminated because of unsatisfactory work. Further, in spite of the fact that more of the very incapable students have been eliminated in the control group than in the group which had taken the "How to Study" course (all remaining in the control group were above the 30th percentile on

[5] To check on the representativeness of the control group another control group was obtained by a similar pairing process, from another college (the College of Arts and Sciences, the first control group being from the College of Education). The work done during the quarter before these students went on probation and for the probation quarter may be summarized as follows:

	A	B	C	D	E	Total	Points	Ratio
First Quarter	0	10	90	110	220	430	320	.74
Probation Quarter	5	25	88	104	180	402	375	.93

The average load of this second control group during the first quarter was 13.9 hours and the point-hour ratio was .74. Again, the marks of this group closely parallel the marks for the first quarter for the experimental group.

For the probation quarter the average load was only 12.9 hours—and nevertheless the point-hour ratio was only .93. This second group thus made even less gain than the first control group, and again the gain is small compared with the advance made by the probation students who took the "How to Study" course.

the intelligence test whereas 7 in the experimental group were below that ranking) there are more in the control group back on probation, and the point-hour ratio is lower.[6] The very important fact seems to be that the "How to Study" course is continuing, beyond the time when it was taken, to help these students.

Summary

The paper describes an effort to train a group of failing students to do efficient college work. It may be briefly summarized as follows:

1. The group dealt with consisted of 31 students who had the previous quarter failed more work than they had passed; 8 students had failed everything; all but 6 were on probation.

2. This group was given a course on "How to Study" which included (a) personal interviews for diagnosis and guidance, (b) lectures on methods of work and other related topics, with reading, (c) a laboratory period for practice of such methods under observation and guidance, and (d) drill on special weak points, and other special individualized aid.

3. Careful analyses and comparisons with control groups show that the group markedly improved in college work as a result of this treatment. Further, this improvement was not merely for the period of the course; the "experimental" group continued to do better than the control group during the following quarter.

[6] The point-hour ratio of the "How to Study" group is lower than it was during the quarter when this course was being taken—as might be expected. But it is important to note that the point-hour ratio (1.7) of the group is up to the junior year requirement, whereas the control group is not to this important level.—It might be argued that it would be better if the 7 students in the experimental group below the 30th percentile had been eliminated. But instances are not lacking of such students' graduating, though the great majority of them will not graduate. The above data shows that they can at least be distinctly improved in methods of work. To object to giving them this help on the ground that they should be eliminated as soon as possible seems a very crude "laissez faire" policy.

III

A FEW CASE STUDIES OF PROBATION STUDENTS WITH NOTES REGARDING REMEDIAL WORK

JESSIE FERGUSON

The previous article has dealt with a class of probation students, as a group. Such a discussion may be very misleading in that individual peculiarities are lost sight of, the complicatedness of each case not realized, and the very human nature of the problems presented by these cases not felt. The following brief case studies are, therefore, included to example and vivify what was said in the previous paper. The cases reported are among the difficult ones met, to show what can and cannot be done (or at least *was* not done) with such students.

CASE NO. 1: TOO MUCH OUTSIDE WORK, INFERIORITY FEELING, AND PANIC FROM FEAR OF FAILURE; LOW ABILITY.

Ruth S. was a colored girl who showed a bad inferiority complex which had considerable basis. She had never before attended a school where there were white students. She had saved about $25.00 to bring with her to college so it was necessary for her to earn her board and room by housework. She had no money for books and was once unable to turn in a report because she had no paper on which to write it. The people with whom she lived imposed upon her to a considerable extent in the amount of work they demanded, in return for board and room; she got three meals a day for four people, doing all the cooking and cleaning up after the meals, also served the meals so that her own food was eaten in between calls to the dining room, and in addition, did all the cleaning of an eight-room house. With this situation she was attempting to carry 15 hours college work, all of which she failed. For her winter quarter she elected a course in Geography, the probationer's course in Psychology and—for some unknown reason, a course in College Algebra. It should be mentioned that she stood at the first percentile in intelligence. By the end of the second week Ruth was constantly in tears and obviously much distressed and bewildered, chiefly on account of her course in Algebra. It chanced that the section in which she had been placed contained no other colored person and no other girl, and that all the other students were prospective engineers.

The basis for her complex was fairly obvious. She was colored, she was not very bright, some of her courses were too hard, and she was badly overworked. She is very seriously interested in her college courses and has an attitude toward scholarship far better than is found in the average student. She can probably never graduate from college. For the time being, however, she

was quite adequately adjusted by withdrawing her from the course in Algebra, by arranging her schedule so that she carried only two courses, and by selecting her courses for her. The woman with whom she lived was interviewed and it was pointed out that Ruth's work was worth much more than she had received. The woman agreed to give the girl a dollar a week(!) so that by the end of the course Ruth had been able to buy herself a notebook and paper, one or two books, and a new dress which did a good deal toward restoring her self-respect as she felt that she no longer was completely poverty-stricken. Another line of treatment consisted in having her promise to recite once each day in each class so as to overcome her extreme shyness. This was somewhat of a trial as she had a slight speech difficulty in addition to a distinct negro dialect, but she persisted and by the end of the quarter was taking a part in almost all the class discussions.

Ruth will not remain adjusted very long in a college community. She will soon find more courses that she cannot pass. It will not be long until some one else imposes on her. This coming year Ruth will teach the first grade in a country school in the South where the general standard of intelligence and achievement will permit her to be a respected member of society. If she follows the advice that has been given her she will remain in the South and will not again attempt work in a school in which the students are predominately white. Ruth will be a credit to society if she is carefully handled, but she will never be a successful university student.

CASE NO. 2: EXCELLENT ABILITY, POOR HEALTH, SOCIAL ISOLATION, IDEAS OF INFERIORITY.

Herman R. tested on the University Intelligence Test at the 100th percentile. He came into the class because he was below the point hour ratio that was necessary to remain in college. He had failed two courses and had rarely received a grade above a C in his two years of college work. His physical examination revealed the fact that he was underweight, that he was extremely constipated, and that he had a sort of convulsive attack from time to time. His history showed a period of serious illness three or four years previous; during this illness he "slept" continuously for eight days and was exhausted for some time thereafter. This boy was sent to a physician who gave him a definite diet and some very definite rules concerning exercise and sleep. It appeared also that he had been doing a good deal of outside work of a kind that kept him out late at night. He was troubled with insomnia, and with a conviction that he was unable to do college work.

His educational tests showed him to stand well in all subjects. As he was observed in the laboratory from day to day it became evident that he was irritable and rather irresponsible. He was discouraged about his work and had a rather definite inferiority complex. He had been living alone but during the quarter of treatment was encouraged to move into a house with other boys. He also had his eyes corrected, the examination showing astigmatism and a slight muscular disbalance. Work that kept him out-of-doors three or four hours a day was found for him in place of his previous job. Perhaps the

greatest element in his recovery was his knowledge of where he stood on the intelligence test. He was told his score on the basis that it would work as an encouraging factor, as indeed it did.

The correction of his eyes plus the correction of his digestive difficulties got rid of most of his irritability and permitted him to really concentrate on his work. His convulsive seizures entirely disappeared as was to be expected, as they were pronounced by the doctor to be due to auto-intoxication (at the time when he first came under observation this boy frequently went five or six days without any movement of the bowels). He coöperated exceedingly well, stuck to his diet, gained about 15 pounds, and has much better color. The training in planning work, in systematic study, and in outlining seemed to be very helpful in eliminating such study difficulties as he had. During the winter quarter he received one A, one B, and one C, which is by far the best record he has made. He is also notably improved in his self-confidence and in his ability to concentrate. If he persists in his program of hygiene he should finish his university work without further difficulty and with a creditable record.

CASE NO. 3: PHYSICAL FATIGUE.

Mary W. is included as a type of case very common among girl students. She is a rather slightly built girl with a history of having always been a bit delicate and not very vigorous. She is enrolled in the physical education course of training. When she was examined she was found to be badly underweight, anemic, and to have a slightly enlarged heart. An account of her activities for the week preceding her examination and the week following it (during which time no attempt at altering her schedule was made) revealed that this girl was standing up in laboratories 14 hours each week and that she was playing basket-ball or soccer or was in a gymnasium class 16 hours one week and 21 the next. All of this exercise was not required but about 14 hours of it was. The rest was the result of her natural interest and of some pressure for her to try out for her class teams and for intramural teams. The first two times that she came to the laboratory, where she could sit quietly and where there was no immediate necessity for activity, she went promptly to sleep. Her case was not difficult to diagnose. There was nothing the matter with her but overwork and a resultant inability to learn. Her own account was that by night she was so exhausted she could not seem to understand what she read and that she went to sleep whenever she tried to study. Mary was a rather bright girl according to the university tests and according to the writer's observation of her throughout the quarter. Nevertheless she had received only two C's during her four quarters of university work with all her other marks D. That she had never failed anything was due to her native intelligence and her persistence. In addition to her exercise and her laboratory work Mary was working four hours a day waiting on table. In the record she kept of her activities for two weeks she was constantly doing something that had to be done at that precise moment, from 8 in the morning until 8 at night every day. For six days of the week she had only two leisure hours.

Mary responded very well indeed to treatment. She was able to quote the doctor's authority to let her out of class teams and intramural athletics. She

dropped one gymnasium course and stopped her outside work. Every afternoon she slept for two hours in addition to retiring about 9 o'clock each night. She re-arranged one laboratory period so that she could get some morning hours free for study. Her only place for work was her own home where she might use the dining room table in case no one else happened to want it, but during the morning hours her house was relatively unoccupied and she could get a great deal accomplished.

The work on note-taking was of especial value for her as was also the silent reading drill by means of which Mary's speed increased from fifth grade standing to well above ninth grade. Mary's notebooks became beautifully organized so that work was better understood and reviews greatly facilitated. As a result of these measures she earned her first A and first B, and made a C and a D in her other two courses. She seems to have a very good grasp of the situation and should be able to keep herself in condition throughout the rest of her career. Mary was very typical of many students, in that she was overworking. Sometimes too many social interests and too much outside work may have a similar effect in causing fatigue.

CASE NO. 4: LACK OF ACADEMIC AWAKENING.

Amy D. is an exceedingly attractive, bright girl who entered the university in the fall and proceeded to fail everything she took. Her percentile standing is 76. As the interviewer talked with Amy it became evident that the girl was very immature in most of her attitudes but that she was possessed with an enormous amount of self-confidence. Her own explanation of failure was probably correct. She attended approximately a third of the meetings of her courses and was able very nearly to pass them even upon such slight acquaintance. She continued to stay out of many of her second semester classes, with the same idea that she was bright enough to miss much work and still "get by." The interviewer talked with her every few days about her work, asked her how many times she had cut, and tried to relate the work to the girl's interests and to correct her attitudes. One particularly good method of attack was to have her find out what her father's salary was and estimate the amount of money that was being spent on her in comparison to the rest of her family. She apparently had never before realized that she was wasting the money her family was sending her. Neither had she had before any idea of the rather small salary her father received. These considerations seemed to have a somewhat sobering effect upon her. She was further urged to study hard for a particular examination to convince the interviewer that she could do good work if she would try. She made 98 percent on this particular examination, on which the next nearest student received only 72 percent. Her appearance at the top of the class was such a blow to her classmates that she became the center of considerable talk and interest. As a result she concluded that it was quite as interesting to excel in college work as to excel in anything else, and she set her mind to see how many A's she could "pull out of the fire." She obtained an A in Anatomy, a B in Physiology, B in English and B in Psychology, which was a somewhat extraordinary record considering she had failed three subjects the preceding quarter.

This girl is to be thought of as mentally "unemployed." She had nothing whatever on her mind and she had a rather childish adjustment toward her environment. She still takes a somewhat immature delight in her good marks but the chances are that she will soon outgrow this characteristic as well. Having become really interested in her university standing and incidentally in the class work presented to her she will probably never again be a problem.

CASE NO. 5: MARKED DEFICIENCY IN ELEMENTARY SCHOOL PREPARATION (IN THE "TOOL" SUBJECTS).

Julia M. was a Freshman in the College of Education. She had been in college one quarter during which time she had failed the entire 15 hours she was taking. According to her own testimony she was working as hard as could be expected; she seemed to have planned her time well and to have applied herself earnestly and with interest. She tested at the 35th percentile on the university intelligence test. There appeared on the surface no particular reason why she should have failed so much work. However, on the educational tests she showed a performance in reading of fifth grade level, in spelling at sixth grade level, in English at fourth grade and in handwriting and arithmetic at sixth grade. Her English was the worst of any student in the class; she was unable even to discriminate between a real sentence and a fragment when confronted with the two. On a single paper that was five pages long—about 450 words—she made 69 mistakes.

In view of her standing on these tests it became clear that she failed her English Composition, her Chemistry, and her History largely because she could not write, solve simple arithmetic problems, or read with any reasonable degree of speed. Her school history revealed a considerable moving about from place to place, but not enough to account for all of her poor standing. She seemed surprisingly unfamiliar with facts taught in elementary school; she had apparently not forgotten her work, but had never learned it.

During her quarter of probation she was taking history over again, was taking the probationer's course in psychology and a course in "Zero" English —a course for failing students in English for which no university credit is given and from which a student must work his way into the regular required English course. The treatment given consisted almost exclusively of drill work in fundamentals. Her reading rate was increased and her spelling and English considerably improved. She did not reach eighth grade standing in English composition, however, in spite of drill from two sources. Her arithmetic work was left until the end as she was not having immediate need for it, but enough work was done to raise her standing to eighth grade level (though probably not enough to keep it there). Julia's notebook was so confused and disorderly that she could not even find where she had written down assignments. Her notes consisted of isolated remarks, usually in such poor English and so fragmentary that she could not tell what was meant. The notebook was inspected every two or three days, and greatly improved in neatness and in intelligibility (although she never got her notes as well organized as many of the students in the class). Julia thought her memory was extremely poor; as a matter of fact

she had a rather high level of retention, but she used no judgment in what she memorized. Usually she attempted to remember every detail as she read, without first getting the outline of the main points. The resulting confusion made her think she was unable to memorize as well as others.

At the end of the winter quarter Julia again failed her history, but passed her required English course—having worked her way out of the zero English section in the middle of the quarter. She was able to remain in college as she received a C in her psychology and an A in her one hour of physical education, thus barely bringing up her points to the necessary level. Her difficulties are not over as her preparation is still weak. Unless she keeps at her fundamentals she is likely to fail something else, but she is greatly improved and may be able to get through college. She knows her weak points, has developed some system in note taking, has correct methods of attack upon a reading assignment, and is not afraid of work.

CASE NO. 6: MARKED LACK OF SCHOLASTIC INTEREST, INFERIOR ABILITY, FAT.

James S. was a freshman in the College of Education. He came to the university from a small country high school. On the intelligence test James stood at the first percentile and on the Binet examination received a mental age of 14-8 (a mental age slightly above average for the general population but below average for college students). In the educational tests given all the students in the class, James scored at the 6th grade in spelling and speed of reading, at the 5th grade in arithmetic and English and at the 2nd grade in handwriting. It is obvious that his preparation for college work was extremely inadequate; he was attempting university work on a little better than 5th grade general preparation (this poor elementary preparation is probably to some degree responsible for the very low score on the university "intelligence" test, since this involves much reading and no little arithmetic).

James appears to be in fairly good physical condition although he is somewhat overweight and has some acne. He himself admits that he eats too much, but he ascribes his condition to being out of training. James began to function on the school baseball, football and basketball teams when he was in the 7th grade. In high school he became a rather important member of his school teams and as such was not subjected to any very rigorous standards of scholarship. Upon investigation it appears that six other students coming from the same small town have either failed their work completely at the university or have had extremely poor records. In fact, there seems to be evidence of an almost criminal neglect of scholarship on the part of the school authorities in this town.

One further element in James' difficulties is to be found in his lack of interest. During his first quarter at the university James took three courses that he was told to take and for which he had not the slightest enthusiasm. It may be said, however, that he had probably had as much interest in these three, all of which he failed, as he would have had in any other three. All the teachers since James' kindergarten work have failed notably to develop the slightest spark of enthusiasm for anything in a book. He is at present trying to raise his marks high enough to get into a fraternity. Fraternity life appears

to have some slight hold on him but he is not going to be broken-hearted if he is never initiated. It is, however, the only motive which seems to have even an element of force in this particular case.

James is then an average boy (below average, of course, for college students) with very poor preparation, with marked lack of interest in any scholastic effort and with a degree of overweight which makes him sluggish and somewhat lazy. The treatment administered has had some effect as it has been concerned with improvement of physical condition (by as much change in diet as the lad had the will power to bring about), and with stirring up a little interest and remedying the miserable preparation (by use of drill material in handwriting, spelling, English composition, reading and arithmetic). At the end of the course James stood at or above the 8th grade standard in everything but handwriting. He passed all his courses during the winter quarter and the spring quarter. He may, possibly, if his interest can ever be sufficiently aroused, sometime graduate from college; but there is no more than one chance in 50 of his being able to find in the university the particular stimuli that he needs.

What conclusions now can one draw, from study of these cases? Perhaps the first point to be noted is the highly individual nature of the problems presented by these students. There are different background causes of difficulty; reaction to these background factors is different. The final overt crisis is variously (and often in a fashion not seen by the regular college authorities) the product of a very complex total situation.

If immediate situation, temperamental response, and background factors are thus all complex and all various it should be obvious that any effective treatment must be based on careful study of all these matters and must also be varied and adjustable to the needs of each case. It then soon becomes evident that the repertoire of procedures which the college official has to hand is very distinctly inadequate. In particular it should be emphasized that the institution may make a major contribution to the welfare of a student, and still not graduate him. Thus it was quite evident that in spite of every help, cases of low rating in intelligence could *not* be made capable of doing work of university standard. Nevertheless the university could do a great deal for these students. It could guide them into some courses which might be of distinct profit to them (and might well develop courses more specifically valuable to such students). It could rehabilitate many of them physically—in some cases eliminating handicaps which might later prove critical. It might so build up attitudes and confidence, so adjust ambitions to vocational possibilities, that the necessary abandonment of the college career would be not a crushing defeat, but an eager turning to other more suitable opportunities.

The "probation" students thus present problems which are highly complex and individual. Methods of dealing with these cases should be nicely adjusted to these problems. The probation system of the average college shows recognition of neither of these facts. It makes no explicit provision for study of the total situation from which the failure has come. It makes little positive contribution to the student's educational recovery, and seems to have not the slightest conception of any responsibility for constructive handling of the case in the event that restoration to the ranks of the educationally orthodox is not made. The need for a reconstruing of the whole situation would seem unescapable.

SUMMARY AND DISCUSSION REGARDING PROBLEMS OF STUDY

The papers in this section may, on first thought, seem somewhat diffuse in method[1] and inconsequential as to findings. But comparison will show certain factors recurring as important to college success. And it will be noted that these factors are of some definiteness, and suggest methods of attack which might well prove fruitful in an effort at increase of student efficiency. It is necessary in the first place that certain prerequisites for efficient college work be met: There must be reasonably good health; the student must not be overburdened with efforts to earn a living at the same time that he is taking his college course; he must not be suffering from gross social isolation. Students must learn to make use of simple reading aids such as topic headings, summaries, tables of contents, and graphs. They must learn to review with such aids for guidance, so that reviews may be efficient. They must learn the comparatively simple tricks of outlining, in their taking of notes. They must learn also the further comparatively simple skills involved in a reasonably clear use of the English language in written work (a problem which is, as will be shown later, much more simple than is often supposed).

In the aggregate these items may seem numerous. But when each one is considered by itself it becomes clear that constructive efforts are entirely possible.[2] And this group of papers includes

[1] In particular (as has already been mentioned) the use of the questionnaire in the first paper may be criticized and the general objection made that the section deals too much with what the students say about their study methods, and too little with actual observation of their methods of work, or analyses of the products of their labors. To some extent this criticism is justified. But it should be emphasized that the questionnaire was formulated on the basis of careful observation and investigation of probation students in previous classes of the type described in the second paper, plus unusually close contacts, in social and honorary sororities and other groups, with average and superior students. Further, the procedure in the probationer's class, and the case studies, involved (the last two papers, perhaps, do not bring this out as fully as should be) constant unobtrusive observation of the behavior of these students, and analyses of their written work and other productions. Everything considered the total investigation summarized in these three papers would seem to have included an unusual variety of approaches to the central problem—and an unusually close contact with practical issues.

[2] With further analysis, remedial work should be still more facilitated. For instance, it was found that poor students did not organize their notes. But what, more specifically, were their difficulties in organization? Did they perhaps tend to a mere long series of coördinate headings? Might not perhaps simply some drill on a system of numeration for headings, and spacing of subordinate topics, help? May there not be certain particular types of subordination which

material to prove that this is so—to prove that (as was suggested in the introduction to this section) the efficiency of college students as students can be definitely improved, and in some instances an educational rehabilitation brought about.

The situation is thus by no means hopelessly complex; there is in fact already promise that something of a reconstruing of the problem of the failing student may result, from such work. It is important in closing this section, however, that something of the larger possibilities, of work in this total field, be touched upon.

There are no educational commonplaces which are more so, than remarks about the necessity of training students to think. The value of a college course is not primarily in its content, if you please, but in its development of efficiency in thinking. Under the circumstances it is strange that methods of effective thinking have received so little research attention (though curiously enough the psychologists have spent much effort in investigation of possible sensory content during the act of thought; and educators have been generous with their theorizing on the topic). Now the writer wishes to suggest that the papers of this section are approaching, in a very practical and very worthwhile way, this problem of training in thinking.

It is true that the kinds of thinking chiefly dealt with were not perhaps the finest types of creative thinking, for the simple reason that such thinking seems often not stressed in college courses, or given the recognition of good marks. But a determination of the factors making for academic success in the colleges as they now are would seem a natural first step. And in further work—well, why not "job analyses" of the mental activities of men who *are* creative thinkers, comparisons as regards methods of thinking of those in adult life who are successes (by whatever criterion one may wish) and those who are failures, case studies of such individuals? It is conceivable that such research might not only give a new, constructive approach to the problem of the failing student. It might largely reformulate conceptions as to the larger "disciplinary" values of a college training, make possible a new and much more potent training in efficient work and clear thinking—might profoundly modify both objectives and methods in college and university teaching.

students failed to note? From the work in English composition, which will be reported later, the writer is lead to feel that many difficulties can be analysed down to a few comparatively simple troubles of such types. It will then be possible not merely to insist on organized notes, but to say, "Now this or this or this thing is at the center of your trouble."—And constructive work will increase correspondingly in efficiency.

SECTION TWO

CERTAIN PROBLEMS OF CURRICULAR ADJUSTMENT

INTRODUCTION—SECTION TWO

CERTAIN PROBLEMS OF CURRICULAR ADJUSTMENT

The following papers by Dr. Worcester are the result of the most adventurous step in the development of the research program described in this volume—the result of a suggestion to him that he make his thesis topic an investigation regarding the first course in his major subject. The outcome is surely a justification of this somewhat extraordinary notion. His clever and capable work is full of suggestions which should be of very great fruitfulness. It is true that his findings are occasionally distressing. But it should be noted that his data include results from a total of four different institutions.[1] He dealt with only a single college subject, and one course in that subject. But there is good reason to believe that there are other subjects, more frequently taught in secondary school and more frequently supplemented by everyday reading and hobby, and other courses less special and technical, in which these problems of educational coördination are even more acute. It appears reasonable to conclude, then, that his findings have a rather general application. In fact, it would seem that one of the greatest sources of waste effort, in our colleges and universities, was to be found in the total problem of educational coördination with which these papers deal.

It is also to be noted that Dr. Worcester's work is not merely critical; throughout, constructive suggestions are made, and experiments with methods for dealing with these malcoördinations are included. In short, it would seem that he had made a contribution of the first importance to the study of problems of higher education.

[1] To prevent any possible embarrassment to these institutions, they are referred to simply as "College A," "School B," or "a teacher training institution," and the results otherwise handled so that the source of any particular items in the results can hardly be inferred by the reader.

IV

"CHILD ACCOUNTING" IN HIGHER EDUCATION*

D. A. WORCESTER

For the past several years professors in schools of education have been devoting much time and research to the discovery and recognition of the great individual differences (such as in rate of progress through the grades, educational attainment, ability) existing among pupils of the public schools, and have been urging that all sorts of records be kept and data gathered to the end that the proper instructional adjustments be made to meet the needs of particular children. "Break up the lock-step in education and do away with the evils of mass instruction" has been the cry. "Find just where the child is and let that finding constitute the basis of the subsequent curriculum." The far-reaching changes in school procedure which have been the result of this labor is evidence of the success of this effort toward the individualization of the treatment of the public school pupil, although the program is by no means completely developed. The movement is, however, well under way. And some of us who have been seeking so assiduously to cast the beam from our brother's eye may now, perhaps, with safety take a little time to see if there be a speck of dust in our own.

THE PROBLEM

The purpose, then, of the present study is to investigate some of the possible differences existing among students in college and university courses, which differences should, directly or indirectly, influence the shaping of the course of study. Specifically this study reports variations found among students in first courses in educational psychology as to: college classification, number of courses previously taken in psychology, teaching experience, knowledge of

* This and the following papers summarize a thesis submitted in partial fulfillment of the requirements for the doctor's degree at Ohio State University. The writer wishes to acknowledge his obligations to Dr. E. R. Wood, Director of the Bureau of Educational Measurements, Kansas State Teachers' College, for the great help rendered by him in gathering data for this thesis, and also to Assistant Professor H. J. Arnold of Wittenberg College, and assistant Professor H. J. Peterson of Ohio University, for their cooperation in obtaining material.

psychology possessed upon entering the course, and further courses to be taken in psychology.

The College Classification of Students in First Courses in Educational Psychology

The following table shows the college status of students in the first course in educational psychology in three institutions, in the spring of 1926. A total of 284 students is involved.

TABLE I

College Classification of Students in the First Courses in Educational Psychology in Three Institutions, Spring 1926

Institution	Percentage of Enrollment in Each Year					
	Fresh.	Soph.	Jr.	Sr.	Grad.	Special
A.	30	36	17	13	2	2
B.	30	32	25	12	1	
C.	2	6	51	37		4

It will be seen that institutions A and B show students in this course from every college "grade" from freshmen to graduate students, while in institution C nearly all of the registration is in the two upper years. That the situation is not static from one period of the year to another is seen in the next table which shows a comparison with enrollment in this course in fall and in summer, in one institution (summer of 1925).

TABLE II

College Classification of Students in a First Course in Educational Psychology, First Semester, Second Semester, and Summer Classes

	Percentage of Enrollment in Each Year					
	Fresh.	Soph.	Jr.	Sr.	Grad.	Special
First Semester	1	52	30	12	1	4
Second Semester	30	36	17	13	2	2
Summer	11	19	20	19	16	15

The table shows many freshmen in the course in the spring, and over 60 percent of the enrollment in the freshman or sophomore years, while in the autumn there are very few freshmen, the concentration being mainly in the sophomore year with a large number of juniors and a good sprinkling of seniors. In the summer the situation is still different; the enrollment is spread over all classes, with 50 percent, however, in the senior, graduate, or special groups (the special student in the summer is likely to be a mature teacher and so to be classed with seniors and graduates).

In short, study of enrollments in the first course in educational psychology in three institutions shows the academic status of the

students taking this course to range all the way from freshmen to seniors or graduate students; it is also found, regarding one of these institutions, that the composition of the class varies markedly from fall to spring, and spring to summer. With respect to academic classification the students in this course are, evidently, by no means either a homogeneous or a stable group. Some recognition of these facts, in the handling of the course, would seem desirable.[1]

The Number of Courses in Psychology Taken Previously to the One in Educational Psychology

The following table shows the number of previous courses in psychology taken by students in the first course in educational psychology, in the three institutions mentioned above (spring 1926):

TABLE III

The Percentage of Students Pursuing Courses in Psychology Before Taking the First Course in Educational Psychology

	Number of Courses			
Institution	*0*	*1*	*2*	*3 or more*
A		50	42	8
B	4	88	5	3
C	4	53	25	18

Although the class in institution B includes some who have had no psychology and some who have had three previous courses the situation in this respect is quite good—88 percent having had just one earlier course and, as it also appeared, 92 percent of these having had the same course. On the basis of the table it would seem that institutions A and C were facing much the same problem. Further data, however, show that in reality the situations are very different. In institution A the class is almost evenly divided between those who have had one course and those who have had two. Moreover, in general, the same one course or the same two courses had been usually taken before the one in educational psychology.

Institution C has a much more perplexing situation, as is shown by analysis of courses taken before the one in educational psychology. The students who had had but one previous course in psychology had taken either general psychology 4, 5 or 9 hours, Analytical Psychology, Child Psychology, or Social Psychology. Those who had had more than one previous course had taken the following combinations: General Psychology and Analytical, Adolescent, Child, Social, or Abnormal Psychology; Analytical

[1] The criticism will, perhaps, be offered that in spite of differences in classification all the students are alike in their ignorance of Educational Psychology. Light on such criticism will be shed by some of the later studies.

Psychology[2] and Adolescent Psychology or Experimental Psychology; Child Psychology and Psychology for Normal Schools; Physiological Psychology and Social Psychology; General Psychology with Child and Educational Psychology, Child and Psychology of the Non-Typical Child, Analytical and Experimental Psychology, Analytical and Genetic Psychology, Analytical and Child Psychology, Human Psychology and Psychology of Religion, Essentials of Psychology and Child Psychology, Abnormal Psychology and Psychology of Non-Typical Child; Elementary, Clinical, Abnormal and Psychology of Non-Typical Child.

According to college classification institution C appeared to have the most homogeneous group of any of the schools studied, but the above analysis shows that perhaps in reality, for teaching purposes, the group is very heterogeneous indeed. The instructor here has some in his class who have had no previous course and he has some with as many as four other courses; but what these other courses may have been is very uncertain. He can be sure that a general course has been had only in the case of those who have had three or more earlier courses. It is impossible to believe that the students came to the course in educational psychology with a background in the science sufficiently alike to make possible any common point of departure.

Teaching Experience of Students Enrolled in First Courses in Educational Psychology

Educational psychology is a professional course; it is so intended and is so in the minds of those who take it. As a professional course, educational psychology attempts to apply, to the problems of teaching, the findings of psychology. Now, just as the empirical chemist sometimes discovers—although probably more laboriously—the same formula as does the research chemist so the teacher in service may, in the course of her work, find much of sound psychological value though she has never read a text nor heard a lecture on the subject. She will probably, as a matter of fact, have studied reading circle and other material, attended teachers institutes, and otherwise obtained professional information. At any rate teachers, having a first hand knowledge of the problems of teaching, approach the course in educational psychology with a different attitude from the attitude taken by those without such teaching experience. The following table gives the teaching experience of members of classes in the three institutions investigated.

[2] The course in Analytical Psychology is understood to be largely one in Psychoanalysis.

TABLE IV

TEACHING EXPERIENCE OF STUDENTS ENROLLED IN FIRST COURSES IN EDUCATIONAL PSYCHOLOGY, SPRING 1926

	Percentages						
Number years experience	*0*	*1*	*2*	*3*	*4*	*5*	*5 plus*
Institution							
A	89	3	5	1			2
B	90	5		3	1		1
C	88	8	2			2	

Although by far the majority of these students have had no teaching experience, there are from 10 percent to 12 percent who have had such experience. The next table shows the experience of members of classes in one of the institutions for the summer term.

TABLE V

TEACHING EXPERIENCE OF STUDENTS IN A FIRST COURSE IN EDUCATIONAL PSYCHOLOGY, SUMMER SESSION

Years Experience	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*10 plus*
	26	12	13	10	6	5	5	3	5	2	4	9

The contrast between the two above tables is very striking. Forty-nine percent of the summer students had taught for three years or more. This fact, together with the greater maturity and higher classification (as shown in a previous table) of the summer students certainly suggests the need almost for a different course for that term than for the other terms. It should be noted, however, that there is quite a percentage of the summer people who are without teaching experience and who are of lower class standing. The needs of these must be provided for—possibly by a separate section.

KNOWLEDGE OF GENERAL PSYCHOLOGY POSSESSED BY STUDENTS UPON ENTERING THE FIRST COURSE IN EDUCATIONAL PSYCHOLOGY

The fact that students have taken a prerequisite course is not in itself a guarantee that they possess a definite fund of background information. This is true in general. It is particularly true for educational psychology since, in addition to the lack of surety as to the degree of original learning and as to the amount of forgetting which has taken place, there is the fact that the elementary course in general psychology, while perhaps more uniform in content from department to department than is the one in educational psychology, is still far from being established as to content. It would surely seem practicable and worthwhile, then, to sink a boring, as it were, here and there to determine the foundation upon which the new course is to be built. To this end examinations which had been pre-

viously used in courses in general psychology were given to those beginning the first course in educational psychology in one of the institutions already mentioned—they were given on the first day of the new course. Two such examinations—neither of them made by the writer—were used. No attempt was made to discover how long it had been since these individuals had taken their course in general psychology. It was immaterial to the purpose, which was to find out how much was known at the time of beginning the course in educational psychology.

Examination A required written answers, and although so phrased that answers would be brief and quite definitely scored, was of essentially the traditional type. The examination consisted of 12 questions, but involved a total of 61 scoring points; it was taken by 53 students. Examination B was of the objective type, consisted of 47 questions[3] and given to 133 cases.

The following table shows the distributions of total scores on these two examinations:

TABLE VI

DISTRIBUTIONS OF SCORES, EXAMINATIONS IN ELEMENTARY PSYCHOLOGY GIVEN ON FIRST DAY OF A COURSE IN EDUCATIONAL PSYCHOLOGY

Score	Exam. A	Exam. B
39–40		1
37–38		2
35–36		2
33–34	3	5
31–32	1	12
29–30		12
27–28		17
25–26	2	17
23–24	3	18
21–22	2	12
19–20	4	11
17–18	4	10
15–16	10	5
13–14	6	5
11–12	9	1
9–10	3	1
7– 8	3	1
5– 6	1	1
3– 4	2	
Total	53	133
Median	15	25

[3] Sample questions from examination A are as follows: (2) Define synapse, receptor, parietal, fissure, stimulus, cortex, short-circuiting, lobe. (12) Describe, as fully as you can, the organic changes taking place during emotion. The following are examples from examination B: (14) What is the smallest number of neurons of which a nervous arc may be composed? 1, 2, 3, 4, 5. (17) About how long are the longest neurons of the body? 3 feet, 8 inches, 1 foot, 2 inches, 1 inch.

That the students in these two groups differed greatly among themselves, in the knowledge of elementary general psychology which they brought to the course, seems obvious.[4] The examinations used were certainly by no means perfect; various factors tend doubtless to exaggerate the differences somewhat. But the gross fact of great differences, in knowledge of the material of a prerequisite course, seems unquestionable.

Other Courses in Psychology to be Taken by Students Enrolled in the First Course in Educational Psychology

While every course should presumably be self-sufficient the material included in a given course, nevertheless, may well be planned with relation to other courses which will probably follow. If most of the students are going on to a particular advanced course, some topics may be reserved for treatment there which ought to be touched upon briefly at least if the subsequent course were not to be taken. For example, if it were known that nearly all the students in a course in educational psychology would later take a course in tests, that subject might be left out of the first course to an extent not justifiable otherwise.

In order to find out what courses would probably be taken after the first one in educational psychology the students in that course, in one of the institutions studied during the fall semester, were asked to indicate the further courses in the department which they contemplated taking. Answers were secured from 186 students.

Although 24 different courses were mentioned, no one of them was planned for by more than 9 percent of the class. Just half of the students said that their program of further courses was not yet decided upon. Although the findings were thus of some value as suggestive of the diversity of interests (and presumably needs for prerequisite information) some more adequate data were needed.

The records of the 184 students who received their Bachelor's degree in Education in June 1925 were therefore gone over, to determine what courses in psychology, in addition to the required course in educational psychology, had been taken by them. The following table shows the results. It indicates that there was one

[4] As would be expected, some topics were generally known by these students while others were not. Thus the percent of correct responses to the questions of Examination A ranged from 0 to 73, and on Examination B from 17 to 91. The fact that a topic has been included in a previous course tells little about a student's present acquaintance with it.

course which had been taken by between 66 and 70 of the 184 students; there were 19 courses taken by 1 to 5 of these students—and so on.

TABLE VII

NUMBER OF COURSES IN PSYCHOLOGY ABOVE THE REQUIRED COURSE WHICH HAD BEEN TAKEN BY VARIOUS NUMBERS OF STUDENTS IN THE GRADUATING CLASS OF A TEACHER-TRAINING INSTITUTION

No. of students	No. of courses
66–70	1
46–50	1
41–45	1
26–30	1
21–25	
16–20	3
11–15	2
6–10	7
1– 5	19
Number of different courses taken	35
Number of students taking no further course	42
Total number of students.....	184

It was thus found that 42 or 23 percent of the group took no course in psychology beyond the required course. And although 35 different courses were taken by at least one of these students no course was taken by more than 36 percent, and only four were taken by more than 10 percent. Once more—in nature and amount of further training in the subject which the students in the required course will take, the group in the required course is found very heterogeneous.

POSSIBLE IMPROVEMENTS

What, now, might be done to improve the total situation exhibited in the preceding pages? Evidently readjustments of prerequisites and programs of courses will help, in certain cases. The point needs no elucidation. Sectioning of students, in courses both large and heterogeneous, may help. The writer is inclined to believe, however, that adjustments within a class, to meet differences of background in each class, are most important. The seventh paper of this series presents certain suggestions in this connection.

SUMMARY

The paper reports an effort to apply certain practices in "pupil accounting" common in the public schools to a basic professional

course as given in three teacher-training institutions. The findings were as follows:

1. No more than 36 percent of the students, in any one of the institutions, were in any one college year; the students ranged from freshmen to graduate status.
2. Some students had no previous training in this general subject; others had had several courses.
3. Although some students had had no teaching experience a considerable number had had ten years or more.
4. Tests of prerequisite information showed striking variations.
5. There is great variety as to further courses in the same general field which students in this course take; most courses are taken by only about one-tenth of the group.
6. There are marked differences in composition between regular-year and summer sections of this course.

V

TWICE-TOLD TALES, OR TAUTOLOGOUS TEACHING IN HIGHER EDUCATION*

D. A. WORCESTER

Since (and possibly before) G. Stanley Hall's famous study of "The Content of Children's Minds," from which he concluded that "There is nothing of pedagogic value the knowledge of which is safe to assume at the outset of school life,"[1] the implicit assumption in practice seems usually to be that the child knows nothing when he enters school and, by extension, that no person about to take up a course knows anything at all concerning the subject-matter of that course. In consequence, educators have given little attention to the "advance information" possessed by pupils as they approach a new segment of the curriculum, and most builders of college courses seem unaware of any problem in this matter. In a few instances students are excused from required English composition courses on the basis of satisfactory examinations, and foreign language students who have studied abroad are sometimes allowed to skip a first course on the basis of knowledge gained outside of the course of study. It is true, too, that in some other courses, as chemistry, a separate parallel beginning course is sometimes provided for those who have taken the subject in high school. Such placement seems commonly to be made on the basis of no actual determination of pre-knowledge, however, and usually the similarity of treatment in subsequent courses shows how little real significance is attached to the earlier training. Very rarely is the content of the course, particularly of a beginning course, determined by the amount of knowledge already possessed by its students. In most cases (the writer happens to know of no exceptions among college courses) the assumption is that the student is 100 percent ignorant of what is to come—and usually the course is so conducted that there is no way of verifying or disproving this assumption.

* The material of this paper has previously appeared, in slightly different form, in the February, 1926, issue of *Educational Administration and Supervision.* The writer wishes to acknowledge his obligation to this journal for the kind permission to reprint this material here.

[1] Cf. Norsworthy and Whitely: *The Psychology of Childhood.* p. 115.

It does not seem altogether improbable, nevertheless, that in some college courses certain individuals may, because of previous training or experience, have come in contact already with a relatively large part of the subject-matter. This paper reports an attempt to investigate the topic by the somewhat unusual procedure of giving a final examination in a college course at the *beginning* of the course.

Results of an Objective Final Examination, Given at Beginning and End of a College Course

At the beginning of the school year, an examination was given to two sections just beginning the first course in Educational Psychology in a teachers college of high standing. The test consisted of 17 specific questions capable of being accurately graded (not prepared by the writer) which were taken from final examinations previously used in this course and institution. The results made it evident that the charge of absolute ignorance could hardly be substantiated against these students-to-be of the course. There was but one whose score was zero. One student made 73 percent of the maximum possible.[2]

The results of this little experiment appeared so interesting as to warrant further investigation of this whole subject. At the request of the writer, an examination equivalent to a final examination was accordingly very carefully made up, and given to the beginning classes in psychology (a total of 185 students) at another teacher training institution. The test was objective and consisted of 90 exercises. Of these, 50 were true-false; 20 were to identify the correct definitions of psychological terms from a list of 40 definitions; 10 were to choose from a list the most probable causes of the presence of a 13-year-old boy in the 4th grade; and 10 were to choose from a list the best remedy for each cause indicated in the previous division. The tests were given during the first week of the semester and again the last week. The results are shown in the table on the following page.

These results, like those of the other study, are startling. During the first week of the course, these 185 students, taking an examination designed as a final examination for that course, averaged 40

[2] This student was a mature woman, of several years teaching experience, who was at the time on leave from a responsible position in a large school system to finish the work for her degree. She had had several courses in Psychology and education at another well known teachers college and was enrolled in the present course because it was required for her degree. It is exceedingly doubtful if the institution were justified in asking, or allowing, her to take the course.

TABLE VIII

SCORES MADE ON A "FINAL" EXAMINATION GIVEN (a) DURING THE FIRST WEEK OF THE COURSE AND (b) DURING THE LAST WEEK*

Scores	Beginning	End
80–84		4
74–79		7
70–74	2	17
54–69	4	33
60–64	2	40
55–59	14	44
50–54	19	22
45–49	25	11
40–44	28	3
35–39	23	1
30–34	21	1
25–29	27	2
20–24	12	
15–19	7	
10–14	1	
Total Cases	185	185
Mean	40	61
Range	14–72	27–83

* The lines on the table show the 85 percentile and the 10 percentile of the "end of the semester" distribution.

points—a score certainly suggesting some previous contacts with portions of this subject-matter. Eight of the students (4 percent of the class) made a score at the beginning of the term in excess of the mean for the class at the end. Two of these early scores exceeded the 85 percentile of the final distribution. One might well ask why the two students receiving these scores should be required to take the course.

The institution at which the test was given adopts in theory for marking purposes the curve of normal probability, and it is assumed that approximately 7 percent will fail. If the standard be put a little higher, and the lowest 10 percent in the test at the end of the course be considered failures, even then at the beginning of the semester 41 of these 185 students (22 percent) received a score equal to or in excess of the score which would be treated as a passing mark on the same test used as a final examination!

Now it is clear that these findings are not to be taken too literally. The test was, of course, subject to all the influences making for unreliability which are met in any examining or testing; as with any test or any examination, the results are to be looked upon as only rough. The great overlapping of the distributions at the begin-

ning and end of the course is partly a product of the unreliability of the measures; this statistical effect is generally recognized as accounting for a portion of the overlapping found in comparing grades in the elementary school. But it seems very unlikely that enough of the overlapping could be so accounted for that the general conclusion could be brought in question; it seems clear that many of these students brought with them to the course (from previous related courses, reading, teaching experience) a considerable amount of information,[3] and probable that on certain topics too little rather and too much had been taken for granted in the preparation of the course of study.

The Important Practical Conclusion

In the elementary school it is a platitude that the teacher should "begin where the child is." It would seem common sense, also, that teaching an individual what he already knows would be wearisome and wasteful for both student and teacher. The above data suggest that college courses often do not begin with the student, and that many college students are often so wearied. The exact details as to reliability of examination or amount of pre-knowledge do not greatly matter. The evidence surely warrants this conclusion, that determination of pre-knowledge is a desirable first step in almost every college course.

Summary

In two institutions, students just beginning an introductory course were given examinations designed as final examinations for the course. The findings were as follows:

1. Most of the students appeared already to know something of the subject-matter of the course.
2. A fair proportion of the students gave evidence of knowing a good deal—sufficient to suggest the desirability of some adjustment, for them.
3. Certain members of these classes had in some way or other (as from related previous courses, or reading) acquired so much of the matter of the course that it was very doubtful if they should have been allowed to go on with it; they appeared able to pass the course before they had taken it.
4. It is suggested that determination of pre-knowledge, at the beginning of a course, should become a common practice.

[3] The wide range of scores made by students at the beginning of the course should be emphasized. It is obvious that the lecture method or any other method involving mass instruction cannot be used in such a situation without much waste of time for some students.

VI

PROFIT AND LOSS IN EDUCATION

D. A. WORCESTER

The previous paper has made some rather surprising comparisons between knowledge of a subject matter at beginning and end of a course. Such findings bring one to the very important question as to just what in detail, has happened. The analyses reported in this paper greatly illuminate the situation—almost painfully illuminate it, in fact.

The examination used in the previous study was given to another group of 238 freshmen students of a certain teacher-training institution during the first week, and again during the last week, of a semester. These students were members of six sections of a course in the "Introduction to Psychology," which course in this institution is equivalent to the first course in Educational Psychology in many universities. The sections were taught by three instructors all of whom were well trained and had had experience as teachers. These three instructors had agreed at the beginning of the course that the test used was reasonably adequate for a final examination, that it covered the main ideas of the course. The instructors were not furnished any results or detailed analyses of the first examination so that any attempts to determine the specific weaknesses of the classes, if made, were carried out independently of this study. The procedure in these classes was, therefore, exactly as usual in so far as could be determined.

The results of the test verified, quite strikingly, the results as to the total amount of pre-knowledge on the part of the students.[1] But it is not with the general results as regards previous information that this paper deals. The first section of the paper presents some results on the distribution of teaching effort over items already well known and items hardly known at all. The second part is con-

[1] There are 36 students who at the beginning of the course tested above the median at the end and 23 at the end of the course who test below the median for the beginning. (Again one must remember, however, that the overlapping is exaggerated by the statistical effects of the unreliability of an examination.) Many of these students had had a course in high school psychology, a fact making it all the more necessary to discover pre-knowledge before proceeding with such a course in college.

cerned with the retention of knowledge from the beginning of the term to the end; this investigation analyzes the improvement to show its source. These studies will be presented in order.

Inequality of Knowledge and Equality of Instruction

It will be remembered that the examination was in four divisions, (1) true-false, 50 exercises; (2) definitions, 20 exercises; (3) a problem, 15 exercises and (4) remedies for the problem, 15 exercises. The following table shows for each part of the test, separately, the percentage which the total scores were to the possible scores and the percent of increase, for each part, which the second test had over the first.

TABLE IX

Percentage of Score Made to Possible Score on Each Part of the Examination, at Beginning and End of Term

Part	Beginning of term	End of Term	Increase
I	64	73	9
II	22	40	18
III	84	86	2
IV	53	60	7
Average	56	65	9

The figures obviously suggest that pre-knowledge was not proportionately equal over all parts of the examination (though differences in type of test, from section to section, probably account for much of these variations). But the important point which seems to be brought out by a study of the scores is that, apparently, the teaching during the term was quite evenly distributed over the known and the unknown. It is true that Part II, having the lowest initial score, showed the greatest percent of increase; but even then its final score was 20 percent lower than that of the final standing of the next highest division—lower by 13 percent than was the next higher section on the initial test. And Part I, showing the second highest increase, was second highest at the start. There is no evidence of what would seem the best teaching strategy—a driving straight at the weak places in the understanding of the class regarding the subject matter of the course.

The same situation appears even more clearly when results on each separate question are studied. The following list gives the

percent of students giving a satisfactory definition for each one of the 20 psychological terms of Part II (for convenience in consideration of this problem the items have been arranged in order of percent passing on the first test—that is, in order of initial difficulty):

TABLE X

Beginning	3	4	5	8	8	10	14	16	21	25	25	26
End	3	8	11	18	22	27	26	37	30	38	60	33
Gain	0	4	6	10	14	17	12	21	9	13	35	7
					31	32	32	33	46	50	56	63
					32	61	50	44	58	75	78	72
					1	29	18	11	12	25	22	9

By no means do the biggest gains come on the items originally the least known. In fact, the most difficult item is the only one on which some gain was not made. The average gain on the 9 items originally least known was 10 as compared with a gain of 15 on the nine items originally best known.[2] The general fact seems to be that those items upon which there was any instruction at all were given approximately the same amount of attention regardless of the degree to which they were already known by the students.

How Students Progress

As one looks over the data in the above studies it is natural to think that, if a person's score the second time he took the examination were greater than the first time, this gain meant that on the second occasion he got right all the exercises upon which he succeeded at first, and in addition marked certain other exercises correctly. Or, in terms of items, if a certain exercise were correctly performed more times on the second occasion than the first, the usual interpretation is that everyone who answered the question correctly at first did so also on the later attempt and that, in addition, certain others answered it correctly. That is the way, it would seem, that things ought to be. But are they so?

For the answer to this question, a record sheet was made showing the response of each of the 238 students to each item of the examination used in the above study. This master sheet (which is not presented here because of excessive details) was now examined with reference to the above question.

[2] On Part I the findings were of much the same character, though slightly less striking. There were 50 questions to this test. On the 25 on which the initial results were lowest the gain was 12 percent; on the 25 initially best known topics the gain was 5 percent.

The first student's record is fairly typical. It shows that his second score on all four parts of the test was 3 more than was his first score (net gain). It appears, however, that there were 10 exercises which he marked correctly the first time but incorrectly the second time (total *loss*). There were 13 exercises marked correctly the second time which were missed the first (total *gain*). Although this student made a net increase of only 3, he had changed his response in 23 cases. More extreme is another student who lost 19 points, i.e., marked wrong the second time 19 exercises which he had marked right the first time. He gained 26 points, i.e., marked correctly the second time 26 exercises he had missed the first time. He thus made a net increase of 7 but had changed his response on 45 items, or one-half of the total exercises of the test.

The following table summarizes the situation for the entire examination. It shows that, for instance, one student lost a total of 26 or 27 points, one student gained 32 or 33 points, and so on. The median loss is larger than the median net gain—over half of the total gain.

TABLE XI

DISTRIBUTION OF LOSSES AND GAINS
238 COLLEGE STUDENTS

Points	Loss	Gain
32–33		1
31–31		6
28–29		7
26–27	1	14
24–25	1	13
22–23		27
20–21	1	24
18–19	4	30
16–17	9	38
14–15	13	33
12–13	43	27
10–11	53	12
8– 9	56	3
6– 7	37	2
4– 5	20	1
	238	238
Median	10	18
Median net gain	—	8

These same facts appear in somewhat different way when the results are examined not student by student, but item by item. For instance, on one item of the definitions test there was a loss of 28 and a gain of 63, giving a net gain of 35 points for that item, but

showing that 91 persons had changed their response to the question. One question gave this curious result, that no single person who marked the right answer the first time, checked the right answer the second time. The following table shows the situation for Test II as a sample of the findings.

TABLE XII

NUMBER, OF 238 STUDENTS, WHO ON EACH QUESTION OF PART II AT THE END OF THE COURSE (a) ANSWERED WRONGLY WHEN AT THE BEGINNING OF THE COURSE THEY HAD ANSWERED CORRECTLY, AND (b) AT THE END OF THE COURSE CORRECTED A PREVIOUS WRONG ANSWER; ALSO (c) THE PERCENT WHICH LOSSES WERE OF GAINS (A ROUGH MEASURE OF THE EXTENT TO WHICH THE TEACHING WAS UNAMBIGUOUS).

Exercise No.	Loss	Gain	Percent
1	20	42	48
2	28	55	51
3	17	73	23
4	7	22	32
5	26	42	62
6	28	63	44
7	32	55	58
8	11	80	14
9	12	63	19
10	44	45	98
11	30	59	51
12	12	70	17
13	8	8	100
14	15	48	31
15	11	35	32
16	11	41	27
17	6	89	7
18	11	51	22
19	8	17	47
20	23	65	36
Average	18	51	41

The first impulse in interpreting these results is to say, perhaps, (1) that the students were in large part guessing on both examinations. Mere guessing may account for some of these changes, but it is difficult to believe that this is the sole factor. The writer would suggest that three other possibilities are worth considering. Thus (2) some of the material covered in the examination may not have been included in the course, even though the examination was made by the instructors to fit the course.[3] It surely is true, in

[3] It was emphasized that there should not be conscious teaching with reference to the test; it is of course possible that in some instances there may have been a "leaning over backwards." in an effort not to appear to prepare for this examination.

general, that parts of the subject matter which might desirably be included in a course, and are occasionally included in an examination, have not been treated. It is also certainly true (3) that items which have been known at the beginning of a course, as a result of previous contact with the subject-matter in one way or another, may be forgotten. There is a further possibility (4) that is also important; as a result of discussion of doubtful points, and a lack of clarity in the teaching, a student may actually be less certain of a point after he has been taught about it than he was at the beginning. There are many points in psychology where, truly, present discussions of the matter are more confusing than helpful . . . . Certainly the amount of actual loss, at the end of the course, of what was previously known is surprising, and needs both explanation and serious consideration.

Possible Remedies

What now is the moral to be drawn from these findings? Evidently this, that the instructor must be informed in detail regarding the knowledge which his students bring to this course, *and* guide his teaching accordingly; and not only this, he must keep informed —keep in touch with the class—throughout the course. Present practices are apparently about as foolish as this—that a doctor should, prior to diagnosis, treat a group of individuals all with the same medicine, and should continue treatment without determining, from time to time, the effects.

Summary

The paper reports an attempt to find out in some detail what happened to students' knowledge of a subject as a result of taking a course in that subject.

(1) It appeared in the first place that teaching was not adapted to needs, in that parts of a subject-matter least well known at the beginning of the course were still least well known at the end.

(2) Study by item of results from an examination given at beginning and end of a course showed that the gains were by no means clear gains; on the contrary the students lost many questions at the end of the course which they had passed at the beginning, and progressed only because they gained more. Losses were over half as numerous as gains.

(3) It is pointed out that if teaching is to be reasonably intelligent, or efficient, it must be based on constant contact with the progress of the students.

VII

ATTEMPTS TO ADJUST A COLLEGE COURSE TO INDIVIDUAL DIFFERENCES

D. A. Worcester

The previous studies by the writer have shown clearly that persons entering the first course in Educational Psychology vary markedly in regard to maturity, experience, pre-knowledge of the course, and so on. The two studies of the present chapter report first attempts to make some adjustment for these differences, in such a course.

Use of Pre-Examinations

General Pre-examination: First of all an examination was given which had been used as a final test the previous term in the same course. This examination was given on the second regular day of the term and was taken by a total of 115 students. Briefly it may be said that one of the students received the equivalent of a C grade and 8 students made the equivalent of a D grade. These persons were given special reading assignments, and advised merely to skim certain of the regular class assignments with which they were already familiar.

Pre-examination by Topics: The next step was to give, just before taking up the work of each of the several divisions of the course, an examination as objective as possible, covering that section. The first division of the course, as given at this time, was a "background" section dealing with the physical nature and growth of the child. Four instructors, in conference, agreed on a list of questions (76 in all) which thoroughly covered that subject. These questions were put to the students before any discussion or assignments had been made concerning the topic. The median standing was found to be almost exactly 50 percent right. The poorest student answered only 22 percent of the questions correctly; the best answered 75 percent.

It was obvious that to present all of the matter of this section to the whole class would involve great waste. When scored by item, however, it appeared that the situation was by no means a simple one. A few items were quite generally known (for example, the

location and the treatment of adenoids); others (as the meaning of the term *focal infection*) were known by almost no one. The range of correct responses to items was 3 percent to 100 percent. Sometimes particular phases of a subject were known and others unknown: as from the question "What are four common eye defects" it was found that near and far-sightedness were known by nearly all, astigmatism by about half, and muscular disbalance by only a few. Many of the questions were known by approximately half of the students but the students who knew one question were not the same ones necessarily who knew another. While, therefore, a division of the class on total score would be better than nothing as an attempt to so solve the situation, such a procedure would be far from adequate. To neglect those items known by about half of the students would leave the other half uninformed; to present these points to the whole class would involve a waste of time for half of the group. It seemed imperative that some sort of provision be made tending toward individualized instruction.

The writer tried in his class the scheme of indicating to those getting the best scores on the test the places in which they were weak, suggesting reading which would help strengthen these places, and then excusing them from class for a few days while that work was being taken up there. The plan on the whole worked well, though it was not as systematic as might be desired.

In contrast to results of the pre-test covering the introductory section may be put findings on a later section dealing with learning. The students met the pre-test on this section with the advantage of some little anticipatory discussion in previous sections. Nevertheless the median score was only 21 percent and the range in score was 0 to 64 percent. Only 5 percent of the students who took the test got more than 43 percent of it. By item the range of correct responses was 0 to 62 with a median of 18 percent; 3 of the items were answered correctly by no one and 9 more by less than 10; only 3 of the items were answered correctly by more than half of the class. On this section, then, the problem of pre-knowledge was much less acute, although individual differences were still striking.

An Experiment in Self Directed Study

It is becoming generally agreed that even the student of the elementary course in Educational Psychology should have at his command certain simple statistical skills, such as are involved in the making of a distribution table, finding medians, using simple graphs. It was questionable, however, if the time limit of the course

permitted the class presentation of such methods (and it was possible, of course, that some students might have already learned them). It seemed that the situation rather indicated the use of some self-instructional materials—such as are constantly in use in the lower grades—so as to adapt to individual differences in preparation and rates of learning, to save class time, and to teach the student to direct his study activities while he is reaching a desirable and required goal. Consequently the plan described below was tried.

The classes were told that the skills mentioned above are almost essential to understanding of courses in education, the keeping of scores and records required in any up-to-date school system, the reading of educational journals. They were also told that the subject was not to be taken up formally in class, but that they would in about two weeks time be expected to give evidence of its mastery. Those who already knew how to do these things had merely to demonstrate the fact by taking a test at that time. The others were referred to a little book called *Methods of Handling Test Scores* by L. C. and S. L. Pressey, which had been prepared for just such self-instruction. This book takes up very simply but clearly those few fundamental statistical processes which the class-room teacher should master. Each process is briefly illustrated and is then followed by carefully worked out exercises. In the appendix these exercises are displayed, correctly performed. In other words, the little book provides all of the materials necessary for self-directed study, including the means of checking one's results.

During the two weeks preceding the first test, a few questions were raised and answered in class, in regard to the methods. At the time set, an examination covering the skills mentioned was given, and each student was excused from further work on each skill on which a perfect performance was made. After another two weeks, a second test was given covering those points missed on the first one; and still later a third test was given. It was understood that the aim was finally in this way to get a 100 percent performance from each member of the class. This scheme of excusing students from work as fast as success was achieved was evidently a most important factor in motivating the study.

At the completion of the third test all but 11 of 147 students in the various sections had completed the work. Of the 62 students in the classes of the writer, 10 (or 16 percent) succeeded on the first test; 21 or 34 percent more succeeded on the second test, and on the third test 26 others finished, bringing the total to 93 percent. Of

the other 5 students, 2 had dropped before the end of the course, 2 received a grade of E (failure) in the course and 1 received a grade of D.

One more thing was tried. At the beginning of the quarter subsequent to that in which the above experiment was conducted, the students were given the same instructions as before and in addition were given a sheet outlining the plan and calling attention to the errors found, during the previous quarter, to be most common. The question was as to the gain such guidance might bring. Briefly it may be said that, by the second test, a total of 72 percent of the class had completed the requirement with a perfect performance. This is a remarkable advance over the preceding quarter when only 34 percent had completed the requirement at the end of the second test.

Discussion

Certain practical suggestions on the basis of the above two studies remain to be emphasized.

It seems clear that the pre-examination, particularly the sectional or topical pre-examination, is a device of great value. Some trial of such examinations, especially for the first section of a course, is urged upon college teachers. What adjustments should follow will obviously depend upon the nature of the findings, the nature of the subject, and a great many other factors.

It also seems clear that one of the most significant recent developments in the elementary school field, the self-instructional practice exercise series, is practical for use in college. It should, in fact, be *most* practical there; college students should be even more capable than sixth grade children of teaching themselves much of what the instructor now ordinarily feeds to them. That a standard of 100 percent mastery can be maintained in a college class is also of no little signficance.

Summary

The paper describes two efforts to adjust to individual differences in background information, pre-knowledge, and rate of learning, in the handling of students in a large university course.

1. By giving (a) a general pre-examination over the entire course at the beginning of the course, plus (b) section pre-examinations at the beginning of each section, striking individual differences were found. By varying reading assignments, and excusing some students from class during the dis-

cussion of topics already known to them, rough adjustments were secured.

2. The minimum essentials of statistics were taught by "practice exercise" materials. These materials required no class time, and were self-instructional. A perfect examination on these minimum essentials was achieved by 93 percent of the class.
3. Certain larger bearings of these experiments are emphasized.

VIII

MINOR STUDIES BEARING UPON COLLEGE CURRICULAR PROBLEMS

D. A. WORCESTER

In the course of the writer's total investigation, major phases of which have been reported in the preceding papers, certain other problems were met which were dealt with in a somewhat incidental and exploratory way. It is the purpose of the present paper to summarize, very briefly, this work.

WIDE DIVERSITIES OF PRACTICE IN DIFFERENT INSTITUTIONS AS REGARDS A COMMON TEACHER-TRAINING COURSE[1]

In connection with the writer's study of problems involved in a course in educational psychology, consideration was given to practices in other institutions. This brief section summarizes certain findings regarding this matter.

The first question was as to the college year in which this course was given, in colleges of education. Figures recently given by Douglas[2] show the course offered to freshmen in 16 institutions, sophomores in 27, juniors in 24. Since the course is commonly prerequisite to further professional courses, it could hardly be given in the senior year. These figures thus would seem to show about as much variety as could conceivably be, under the circumstances.[3]

The next question was as to commonness of content in different textbooks. Douglas' investigation shows Starch and Gates most commonly used. The differences between these two books are striking. Thus Gates gives 12 percent of his text to a discussion of receiving, connecting, and reacting mechanisms, and 4 percent more to a description of conscious states and processes. Starch gives no space to these topics. Starch uses about 40 percent of his space in

[1] This material summarized on the two following pages is presented more fully in the *Journal of Educational Psychology* for January, 1927, pp. 11-17.

[2] Douglas, O. B., "The Present Status of the Introductory Course in Educational Psychology in American Institutions of Learning," *Journal of Educational Psychology*, 1925, Vol. 16, pp. 396-408.

[3] This is not Douglas' interpretation; Douglas interprets his figures as showing much more consistency in practice than the writer considers indicated. The reader interested in the details should consult Douglas' article.

dealing, in one way or another, with the school subjects, while Gates does not touch these matters. . . . In short, it may be said (without going into further detail) that Gates and Starch appear to agree to the extent of only about 33 percent. Another fairly widely used book appears to agree about 50 percent with the first book mentioned and about 30 percent with the second. Still another volume, reported as used as a main text in educational psychology in nine institutions (Terman's *Measurement of Intelligence*), has possibly 5 percent of material which appears also in the first two books mentioned. Of 12 texts in this subject the only topic touched by all of them under the same name was *instinct,* and the treatment of this topic varied from one-half of one percent to 14 percent of the whole text. . . . It is obvious that such comparison of text books is difficult, and that in some cases similarity may be covered up by differences of nomenclature; but that there are great differences from one institution to another would seem clear.

Courses of study were next compared. Outlines of the first course in educational psychology were received from ten colleges and universities. However, a certain university sent two outlines, one of the course as taught and one as the department would like to have it taught; 11 outlines were thus available for comparison. One of the outlines follows rather closely the first book mentioned, and one the second; as has already been stated, these two books seem to have only about 33 percent of commonness. Some courses include laboratory sections while others do not. One outline gives four weeks to intelligence and individual differences, where another gives six. To learning, one outline gives eight weeks and another two. Transfer of training in one course is given in two lectures, in another in two weeks.

In short, it is clear that there are striking differences between courses appearing under the same name in different institutions.

Problems of Technical Vocabulary

The stimulus to the work reported in this section was partly previous research carried on at the Ohio State University indicative of the importance of the technical vocabulary problem, and partly a minor investigation carried out by the writer regarding text book problems as the student sees them. In this investigation a total of ninety-eight students were asked to prepare a statement of what they considered the characteristics of a good and of a poor text book. The results showed "too much technical vocabulary" heading the list of specific sources of difficulty in the text books

mentioned.[4] Further study of the subject was naturally suggested. Such study seemed possibly of distinct relevance to the writer's total problem in that size of technical vocabulary might serve as a rough measure of technical detail in a course, and number of technical terms common to different professional courses in education might function as an indicator of relationships between these courses. A study of vocabulary was in consequence attempted, in an effort (a) to determine the minimum essential vocabulary in educational psychology and (b) to find the relation of this vocabulary to the vocabularies of other professional subjects. These two undertakings will be taken up in order.

The steps in determining a minimum vocabulary in educational psychology were, briefly, as follows. First, ten different text books were read, each one by a different reader, who jotted down all the words considered technical in nature. Next, four instructors went over the combined list which resulted, marking words they considered important; the words receiving more than one vote were retained. Finally, these retained words were classified and marked as belonging to an "essential" or a "supplementary" vocabulary by the writer in consultation with the other three instructors. The final list contained 307 "essential" terms and 252 "supplementary" terms.

It is realized, of course, that this list was very tentative in character and undoubtedly influenced by any bias which the instructors concerned may have had. It did, however, serve two purposes. It was of particular value in the course given by these instructors. And it formed a rough statement of vocabulary for use in further study of this matter. It is to be noted that this vocabulary is not so negligible a matter as might at first seem. Some of the terms were doubtless known to students before they came into the course, but experimentation showed that most of these words were un-

[4] The replies of the students may be summarized briefly, in terms of percent of students mentioning various features, as follows:

A. Mechanical Features: clear printing, convenient size, etc., 86; relatively slight cost, 46.

B. General arrangement of subject matter: readable presentation (interesting) 86; good English, 41; brief introductory statements and short summaries to each chapter, 16; covering of "minimum essentials" without personal bias, 5; arrangement of material so that it can be outlined, 4; inclusion of questions and exercises that are practical and interesting, 4.

C. Specific sources of difficulty: too much technical vocabulary, 39; too much detail (too many quotations, too much minute description, too many graphs) 18; inaccuracy in tabular matter, 10; omission of recent investigations, 10; no attempt to adapt text to group of students using it, 8; failure to explain adequately graphs and tables, 4.

familiar. The course as given by these instructors had about 50 regular class days. There would thus be an average of about ten terms a day if this vocabulary were distributed evenly over the meetings.

The next question was as to the relation of this vocabulary to technical vocabularies in the first courses in History of Education, School Administration, and Principles of Education. In determining technical vocabularies the three most widely used books in the first subject, two outstanding books in the second, and three in the third, were gone over, each book by two readers, the readers being instructed to note all technical or difficult words. Briefly, it may be said that 36 percent of the 559 selected terms in psychology appeared in the "Principles" list, 19 percent in the "History" list, and 15 percent in the "School Administration" list. It is clear that these common terms are of especial importance, as they function in more than one course.

One more thing was done. *The Thorndike Word Book* was used as a statement of the ten thousand most common words of the language. And it was found that the History of Education list contained a total of 1831 words not in the Thorndike Word Book; there were 1076 such words in the School Administration texts; and 1833 such words appeared in the "Principles" list. Evidently vocabulary problems in these subjects are by no means negligible.[5]

Regarding Certain Strange Gaps in University Curricular Offerings[6]

College and university curricula seem in large part to have grown like Topsy; there has been little such careful coördination of courses, or development of the total programs with reference to needs, as would seem desirable. One result, overlapping of courses, is now receiving some attention. But another outcome, omission of certain important topics, has been less discussed. It is with this last topic that this section briefly deals. The question was as to the professional information possessed by students of education. The group investigated consisted of 219 students attending summer session in two well-known colleges of education. Briefly, it may be

[5] Because of somewhat different procedure a similar study of the Psychology list could not well be made.

[6] The material here summarized appeared in more complete and somewhat different form under the title "What Some Teachers Know" in the *Educational Review* for April, 1926. The writer wishes to acknowledge his obligations to the *Review* and to the publishers, Doubleday Page and Company, for kind permission to include this material here.

said that 73 percent of this group had had teaching experience, 47 percent having taught three years or more, that 62 percent were in or above the third year of their professional course. In short, about three-fourths of the group had taught—and the group as a whole was more mature than the ordinary college class. Probably also teachers attending summer sessions are from the more energetic and resourceful portion of the profession. It might thus be expected that these students would have a professional viewpoint, and some little knowledge of professional matters.

These groups of students were first asked to name educational and scientific organizations. To the writer's surprise, 20 percent of this total group failed to name any such organizations; 8 percent mentioned only local organizations; no national organization other than the *N.E.A.* (54 percent) was mentioned by more than 5 percent of the students (save the *National Geographical Society,* 9 percent). One student who had had 35 hours professional work, and another with 22 hours of professional work, could name no professional organization. The students were asked also as to the source of what information they had. Only 11 percent first heard of the *N.E.A.* in connection with their school work, while knowledge of no other organization was obtained in class by more than 3 percent.

Question 2 asked for names of honorary professional organizations. It may be briefly said that no such organization was known by more than 12 percent of the total, and that information again was rarely obtained in class. Question 3 asked about educational journals. It was found that 7 percent could give no names of educational journals, and 9 percent more gave none other than local or state periodicals. No one journal was mentioned by more than 24 percent, and no journal had come to the attention of more than 7 percent of the students through class work. Further questionings showed that, about those journals which they named, students for the most part had little or no information.

When asked to name universities prominent in education the students did somewhat better; two universities were mentioned by more than half. Only 11 percent had received any information in class along this line, however, and in what respects these universities were prominent these students did not know. Much the same findings were obtained in inquiry regarding leaders in the field. No one was mentioned by more than 46 percent, and the special line of work of these people was in most cases not known. It is further interesting to note that barely half the students (57 percent) could give correctly the requirements for a Master's Degree and only 25

percent the requirements for a Doctor's Degree. Three of the 38 graduate students in the group failed to give correctly the requirements for the Master's Degree and ten did not give correctly the requirements for the Doctor's. Again there seems to have been little mention of such matters in class, and little study of the catalogues.

Discussion

What, now, is the major impression one obtains from these brief minor studies? Certainly the striking feature seems to be the lack of any evidence of consistent policies back of the development of the courses dealt with in this study. There is no general agreement among institutions regarding content or curricular position of a basic professional course. There is a vocabulary situation suggestive of a diffiuse and loosely developed terminology in certain professional courses. There appear to be gaps in curricular offerings suggestive of lack of any comprehensive study of the total problem of professional training involved. . . . At least it can be said there is evidence here of the need of study of these questions.

Summary

The paper presents three minor studies regarding professional courses in education.

(1) A comparison of courses in educational psychology in different teacher-training institutions shows a decided lack of uniformity regarding (a) position in the curriculum, (b) content of the textbooks used, and (c) items appearing in course outlines.

(2) Investigation of technical vocabulary in professional courses indicated that these vocabularies were sizable, and involved important interrelationships of material.

(3) Investigation as to the amount of professional information possessed by teachers (information as to professional organizations, journals, etc.) suggested the need for a careful consideration as to possible gaps in the usual scheme of professional offerings.

SUMMARY AND DISCUSSION REGARDING PROBLEMS OF CURRICULAR ADJUSTMENT

The material in this section shows that (a) students coming into a course may be very different in maturity, in the number of relevant courses already taken and in the information from prerequisite courses now possessed, in previous experience likely to be of assistance, and in the amount of further work in that field they are planning to take. Also (b) a final examination given at beginning as well as end of a college course indicated that students differed greatly in pre-knowledge of a course and that certain students who were required to take this work were able to pass the course before they had started it. Further, (c) analytical study of such a twice-given examination showed almost no evidence of concentration of teaching effort upon those topics regarding which the class was weakest; and it was found that half as many responses changed from right at the beginning to wrong at the end as changed from wrong to right. However (d) by means of such devices as pre-examinations and practice exercises it was found quite possible to remedy many of the difficulties above pointed out. Finally (e) certain minor studies showed that the traditional courses in a professional curriculum omitted much important professional information, that technical vocabulary in all courses deserves careful study, that in a supposedly well-established professional course for teachers, standardization was more apparent than real.

The papers of this section thus touch upon a variety of topics. But one contribution is outstanding. There are demonstrated, in ways so striking that continuing neglect of the matter seems impossible, the dominant fact of extraordinary individual differences even in student groups apparently very homogeneous, and the gross educational waste which results if administrative and instructional procedures are not adjusted with reference to these differences. And suggestions are made for such adjustment. The concept of the pre-examination is a real contribution—a device many times as valuable as that almost universal but educationally barren practice the final examination, which delays adequate informing of the instructor until all possibility of using that information has passed. The practice exercise organization of material is shown to be applicable to college students. In fact, it is quite clear that the problems brought out in this section *can* be dealt with, by some better coördination of prerequisites and entrance requirements, and by the above mentioned and other comparatively simple instructional devices.

SECTION THREE

PROBLEMS OF EMOTIONAL AND CHARACTEROLOGICAL DEVELOPMENT

INTRODUCTION—SECTION THREE

PROBLEMS OF EMOTIONAL AND CHARACTEROLOGICAL DEVELOPMENT

Most college and university people are familiar with Wilson's famous remark that in our institutions of higher education the side shows were attracting more attention than the main tent. But close consideration of the typical small college of a generation ago will make clear not only the reasons for this situation, but also its possible desirability! One has only to study, with some care and sympathetic understanding, the total situation. The young people then (as now) came to college in the midst of adolescent problems of adjustment most serious for them and important for their future development and happiness; and these problems were intensified by new problems which the college life presented—problems of adaptation to a strange social group, of living away from home, of existence with a new responsibility and a new freedom. And these young people came from and were shortly to go back to communities in which social and economic problems were perhaps not so complex as they are now, but were certainly pressing, and called for leaders having an informed intelligence and high ideals regarding these matters. And what did the college offer, to bring these young people to an understanding adjustment to their complicated adolescent selves and to their world? To put them in touch with the adult world it began with some plane and solid geometry, some consideration of idioms in French and German, some reading of Cicero's mild platitudes concerning old age, and continued with a program which suggested the jibe that the colleges were institutions with a past before them. And materials and methods to guide the student in his understanding of himself and in a healthy development of his personality, through the stress of the adolescent period? —The very existence of these vital problems was hardly recognized. Small wonder that these students turned in desperation to activities of their own making, not always admirable but at least involving real doing, a certain relevance to common adult activities, vigorous give and take with other people—situations in which there might be real life, and an opportunity for character and personality to grow. These side shows might, surely, be more important than the main tent.

Our colleges and universities have changed since that remote period—a generation ago. To the world of events they are more alert and sensitive. But of the vivid adolescent life surging through them, and its problems, they seem for the most part still unconscious. Yet the important thing that happens to the students during their four years of college is not that they increase their store of information; the important thing surely is that they develop during this period from high school boys and girls to men and women. It is with these much-neglected, little-understood problems of emotional and characterological development that this section deals. As will shortly appear, there is some evidence to suggest that such development proceeds during these college years more rapidly than at any other school period; and it seems entirely conceivable that this development might be—at least as important as any increase of intellectual attainment over this same time. As will also appear, this development has important relationships to academic success.

IX

MEASUREMENT OF PERSONALITY TRAITS*

O. R. CHAMBERS

Instruments for the measurement of intelligence have now developed to the point where results of appreciable accuracy can be obtained. With such development it has become clear, however, that an individual's success in any line of work is conditioned not only by his intelligence; success or failure is the product also to a very great extent of various elements of personality, character, emotional attitude. It is further important to realize that these traits are of great significance as conditioning an individual's place and value in a complex society. They also seem surprisingly subject to modification by proper types of training—as yet little understood. Under the circumstances it seems highly desirable that methods for measuring these non-intellectual traits should be developed. The present paper reports the results of certain experiments in this field.

The nature of the materials used will be indicated by the following samples from the three tests. As will be obvious, the effort in formulating this instrument was to obtain a wide sampling of moral attitudes, of adjustment difficulties as shown by worry, and of interests. Each test in the examination contains twenty-five lines, each of five words. Each word asks a question—that is, the first line of the first test asks in effect, "Do you or do you not approve of smoking?" Each test thus asks 125 questions; the entire examination consists of 375 items.[1] The sample materials are as follows:

TEST I

Cross out everything that you think is wrong:

begging smoking flirting spitting giggling
fear anger suspicion laziness contempt

* This paper is a summary of a thesis presented in partial fulfillment of the requirements for the doctor's degree at the Ohio State University.

[1] The examination is the Pressey "X-O Test," published by the C. H. Stoelting Company, Chicago. For a more complete account of these tests see the *Journal of Applied Psychology*, Vol. 4, pp. 97-104, March, 1920; the *Journal of Abnormal Psychology*, Vol. 16, pp. 55-64, April, 1921; and the further references to be given shortly.

TEST II

Cross out everything about which you have ever worried:

loneliness work forgetfulness school blues
sin headache fault-finding sneer depression

TEST III

Cross out everything you like or are interested in:

fortune-telling boating beaches mountains vaudeville
amusement-parks camping tennis hiking eating

The examination was used in this investigation to deal with two questions: (1) Are college students who are successful academically (make good grades) different in their moral attitudes, emotional maladjustments, and interests from those who make poor grades? (2) Is there any consistent development or modification, as individuals develop from childhood through the college period, in these matters of moral taboos, foci of emotional difficulty, and interest? These two points will be taken up in order.

Relation of Personality Traits to Success in College

The first question was as to the relationship between certain emotional attitudes and interests as covered by the tests, and academic grades. A total of two hundred college underclassmen plus a further group of 57 college men, and a group of 197 college women (also students in the first two years), were the cases worked with[2] in this study. Results will be grouped (as also in the second section of the paper) to show (a) the extent and nature of the findings significant with reference to the problem and (b) some data from use of the most significant items combined as a "differential unit."

Differences between Good and Poor Students: In dealing with this problem the marks of the students investigated were obtained, at the end of the quarter when the tests were given, and these marks averaged. The fifty highest students of each sex and the fifty lowest, in marks, were then set apart for comparison.[3] Table I shows average number of words marked by each one of these groups. As will be seen, the good students seem to be alert to more topics than do the poor students (total number of words marked by the good students is greater). But the differences are comparatively slight.

[2] For a grant of funds without which the extensive tabulating and statistical manipulations involved could not have been made, the writer wishes to acknowledge his obligation to the Elizabeth Thompson Science Fund.

[3] Here, as throughout experimentation with these tests, it was found necessary to handle results for the two sexes separately, because of the sex differences in reaction to many of the items of this examination.

TABLE I

AVERAGE NUMBER OF WORDS MARKED BY (a) STUDENTS WITH HIGH AVERAGE SCHOLARSHIP RECORD AND (b) STUDENTS WITH LOW AVERAGE SCHOLARSHIP (50 students at each extreme, for each sex)

Test	Men		Women	
	High	Low	High	Low
I (Morals)	70	68	66	65
II (Worries)	34	32	34	27
III (Interests)	68	64	60	54
Total	172	164	160	146

The percent of students in each group who marked each item was next determined. The difference between these percents was then found, for each word; this indicated the extent to which each word was differential of students of good scholarship as compared with those of poor school standing. Thus it was found that sixty percent of the superior men students marked "camping" as interesting, while only about forty percent of the men of inferior scholarship so marked this word; "camping" was thus 20 percent differential. A tabulation was next made of these differences. Table II summarizes the result, showing the number of words giving differences of ten percent or more. As will be seen, there is a very considerable number of words which do show differences of some size between the good and the poor students; in fact (as noted below the table) there is a considerable number of words which show twenty percent or more difference.

TABLE II

NUMBER OF WORDS SHOWING A DIFFERENCE OF TEN OR MORE, IN THE PERCENT OF GOOD AND OF POOR STUDENTS MARKING THEM

	Test I Morals			Test II Worries			Test III Interests			Total		Grand Total
	G	P	Tot.	G	P	Tot.	G	P	Tot.	G	P	
Men	30	19	49	28	14	42	27	16	43	85	49	134
Women	28	17	45	42	4	46	42	11	53	112	32	144
Total	58	36		70	18		69	27		197	81	278

Differences of 20 or more—good students 34; poor 9.

Various features of some interest are to be noted in this table. Thus about the same number of words show differences in contrasting the good and poor women students as in comparison of good and poor men. Both sexes show a strikingly larger number of words marked definitely more often by the good students than by the poor. One is naturally carried from observation of these differences

to the question as to the picture of the good as contrasted to the poor student, which might be observable from detailed consideration of the words found differential. Briefly, it may be said that the picture is by no means clear-cut (in contrast to the striking outline picture, to be mentioned shortly, obtained in study of maturity). The good students seem broader in their interests and more ambitious (thus the superior men students are more interested in fishing, camping, hiking, books, Napoleon, day-dreaming, leaders, actors musicians, while the poor men students are distinctly more interested only in smoking and "rough boys."). Good men students worry more (with such difficulties as self-consciousness and moodiness toward the head of the list), seem more of the introvert type. They consider wrong such things as sportiness, toughness, betting, nerve, where the poor men students condemn day-dreaming, slowness, spending, bashfulness, absent-mindedness—the poor students seem more sophisticated. . . . It is to be noted that the results suggest not only strength, but also possible weaknesses, of the good students. However, the picture is blurred, and the whole matter is in need of further study.

Measurement of the "Scholarly Personality": An attempt was next made, by combining words found most significant into what was called a "differential unit," to obtain an instrument for measuring the amount of an individual's interests and attitudes conducive to academic success. Those words which were marked distinctively more often by the good men students than by the poor men students were thus located and considered the "good men students' differential." Those marked distinctly more often by the poor men students were next found and called the "poor men students' differential." Each man student's paper was then scored by counting the number of "good men students' words" he had marked (the result being his "good student score"), the number of "poor students' words" he had marked (his "poor student score"), and subtracting one number from the other to obtain the "net differential score." Thus an average student marked fourteen of the "good student words" and eleven of the "poor student words;" his "net differential score" was then plus three. The net differential scores were thus obtained for the entire two hundred; also for the separate group of 57 men.[4] The same process of group-

[4] For a more complete statement see Chambers, O. R., "Character Trait Tests and the Prognosis of College Achievement," *Journal of Abnormal and Social Psychology*, Vol. 20, pp. 303-311, 1925. For the men's differential unit all words showing a difference of 12 percent or more on Tests II and III, and 16 percent on Test I, were included in the differential unit. For the women's differential (to be mentioned shortly) 10 percent was used as the division line.

ing of differential words into a differential unit, and obtaining net differential scores, was gone through for the women.

The next question was as to the significance of this net differential score. To determine this the net differential score for each group was correlated with the average grade or academic mark. Correlations were also run with scores on the University Intelligence Test, an examination which may be described roughly as a modified army alpha. The coefficients obtained were as follows:

TABLE III

	200 men	57 men	197 women
Grades and X-O Differential	54	46	44
Grades and Intelligence	33	53	36
X-O Differential and Intelligence	23	51	31
Maximal correlation	58	57	48

As will be seen the correlations indicate a relationship, between the net differential score and scholarship, which is by no means negligible.[5]

The next question was whether, by combining net differential unit and intelligence test score, there might be obtained a distinctly higher correlation with marks—a still better prognosis of college success. Some further statistical handling of the results, however, indicated that such a combination, even with optimal weighting of each variable, would not be strikingly superior to the results obtained by the X-O differential alone. The correlations which might be expected, with such optimal weighting, between grades and X-O plus intelligence, is shown in the above tables on the line marked "maximal correlations."[6] Improvement of total prognosis with

[5] It will be seen that the correlation of grades with the net differential score is somewhat lower for the 57 men than for the group of 200. It may be briefly said that the correlations of the net differential score with marks for the group of 200 men and 197 women is probably a bit inflated as a result of the fact that the differential unit was derived from the extremes of these groups. However, the high correlation of the marks of the 57 men with the intelligence test scores (correlation of the form of the university test used at this time with marks averaged around .35 for the university as a whole) would suggest that this small group of 57 was not entirely typical. The slightly lower correlation for the women may be due to the slightly lower standard in selecting differential words. As a matter of fact it would doubtless have been wiser if only words showing 15 percent or more difference had, throughout this investigation, been carried as significant; differences of 10 or 12 are doubtless often chance affairs. But when the work was planned it seemed advantageous to include a larger number of items. In the study of maturity differences it will be noted that the percents are on groups about four times as large, making 10 as a critical point less unsatisfactory.

[6] For the statistical basis for this conclusion, and a more complete total discussion, see the article on prognosis of college achievement mentioned in the more complete report previously mentioned.

further work along this line might presumably be hoped for, however. The important conclusion is this: that it is possible to obtain statements of personality traits related to scholarship which give correlations of very appreciable size (about as large as those obtained between tests of intelligence and marks) with academic success. At least it can be said that further work along these lines is warranted.

Relation of Personality Traits to Maturity

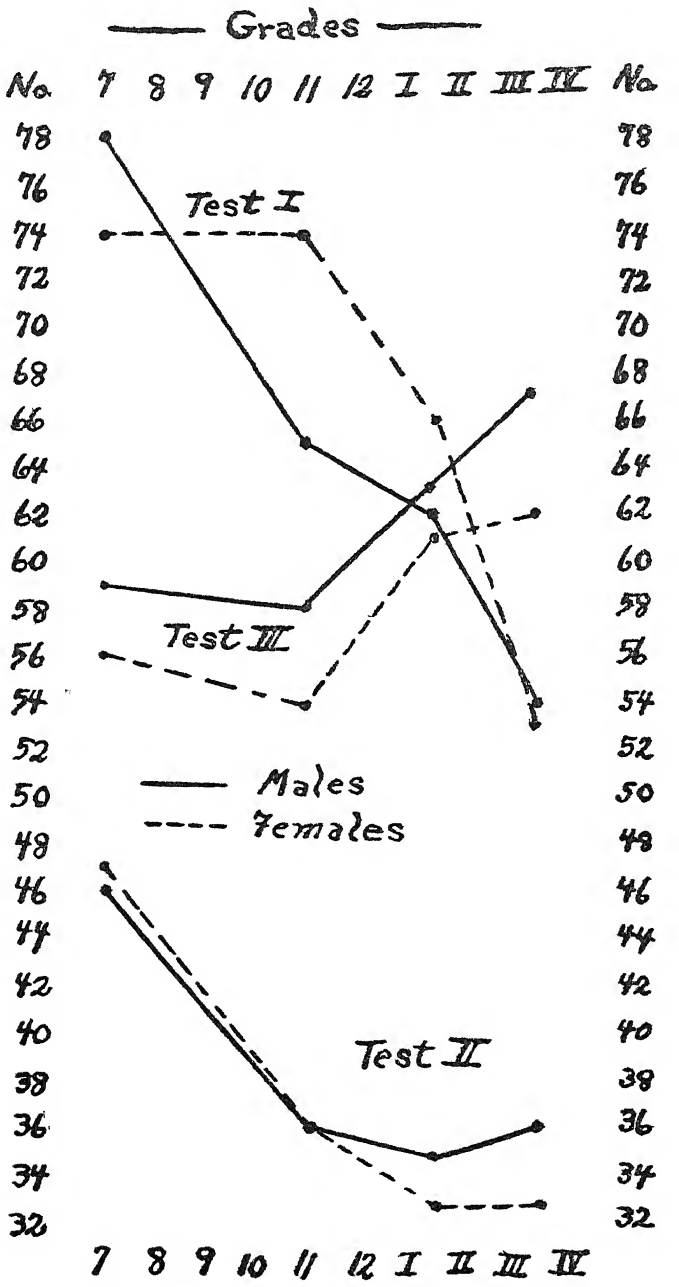
In order to determine the relation of results from the tests to maturity, data were obtained from an average of about one hundred males and one hundred females in grades 6, 8, 10 and 12, and each one of the four years of college (a total of 1734 cases). For convenience in handling, grades 6 and 8, 10 and 12, and the first two and the last two years of college, were thrown together; the discussion will, therefore, from now on deal with results from these four groups.

Difference between older and younger students: As soon as the tests were given and results looked over it was evident that there were striking changes, as one went from the younger to the older groups. The following chart, showing average number of words marked in each group, will make clear the gross differences.

The most striking feature is the marked decrease with maturity in the number of borderland acts which are considered wrong (decrease in moral taboos). There is also both a decrease in number of things worried about and (as will be seen shortly) the nature of the worries, and first a slight narrowing and then a shifting and broadening of interests. The sex differences in this development are also striking. Thus the boys show their most rapid elimination of borderland moral taboos at the beginning of the high school period, but the girls show nothing of this sort at this time, the elimination coming in college (when most of them presumably for the first time got away from home). The greater difficulty of the girl in freeing herself from childhood attitudes, to form her own moral standards and interests, is obvious.

Such striking changes naturally called for analysis. The number marking each word, in each group, was therefore found,[7] and

[7] Since the test contained 375 words to be reacted to and a total of 1734 papers were dealt with (a total of 650,250 reactions) it can be seen that this was a very sizable undertaking. The writer wishes to acknowledge his obligation to the Research Fund of the American Association for the Advancement of Science for a grant without which this investigation would have been impossible. . . . For a more detailed account of work on this problem see Chambers, O. R., "A Method of Measuring the Emotional Maturity of Children," *Pedagogical Seminary*, Vol. 32, pp. 637-647, 1925.


Grades
No.
7 8 9 10 11 12 I II III IV
78
76
74
72
70
68
66
64
62
60
58
56
54
52
50
48
46
44
42
40
38
36
34
32
Test I
Test III
Males
Females
Test II

the figures converted to percents, for each group on each item. That is, the percent was found of boys in grades 6 and 8 marking "camping" as something in which they were interested; the interest in camping shown by boys in grades 10 and 12, and the first two and last two years in college, was also determined. It was thus possible to follow moral attitudes, anxieties, and interests roughly through the adolescent period.

What now in detail are the changes in personality indicated by the tests—and especially, what are the changes going on during the college period? The changing moral attitudes are with reference especially to such matters as cards, pool-rooms, smoking, flirting; divorce is less often marked as necessarily wrong; there is less disapproval of extravagance, spending, borrowing, idleness. One can trace, through the period covered by the investigation, the elimination of childhood worries about fire, lightning, medicine, the appearance and the subsiding of adolescent worry about looks and clothes, the gradual appearance of more adult anxieties about family, religion, marriage. Interests shift from childhood delights in circuses and ferris wheels to the college upper-classman's frankly expressed interest in flirting, fashions, clubs, business, traveling, cards, crowds, the college woman's fondness for talking, card parties, crowds, bargains. Interrelations between the tests are sometimes striking; thus at the time of most marked shift in moral attitudes as shown by Test I, "morals" is marked as an outstanding subject of anxiety. Smoking is distinctly a subject of both anxiety and interest for the younger boy; there is then a marked decrease in moral disapproval, and finally the college upperclassmen distinguish themselves by their liking for the habit.[8]

Measurement of Emotional Maturity: The natural next question was as to whether, by combining words showing the greatest differences into a "differential unit," an individual's maturity or immaturity of personality might not be measured. As a matter of fact in the total study two such differentials were worked out, one for the public school group (children in grades 6-12) and the other for the college students. The present brief discussion will deal with the work with the college group and, since the women show the most

[8] Doubtless many of these changes are to be deplored. Most of them are undoubtedly the result not of schooling but of maturity, and changing social attitudes—might be found even more striking in individuals who had gone from the elementary school into the business world instead of into high school and college, so one must *not*, because these changes appear in the high school and college group, consider them all results of education. However, the present paper is concerned not with moral values or causes, but simply with the determination of changes along such lines in the student group.

striking changes during these years, will be confined to results from that sex.

The differential units for college students were made up of all words showing differences of 10 percent or more, between the Freshman-Sophomore and the Junior-Senior groups. Table II shows the distribution of results with the women's differential unit for maturity, from a total of 450 college women and 107 senior high-school girls.

TABLE IV

DISTRIBUTION OF SCORES, COLLEGE MATURITY DIFFERENTIAL UNIT FOR GIRLS

Diff. Score	H. S. Senior	Coll. Fresh.	Coll. Soph.	Coll. Jun.	Coll. Sen.
0– 2.....				1	3
1– 4.....	1	1		5	7
5– 8.....		3	1	2	10
9–12.....		4		7	12
13–16.....	2	5	5	8	10
17–20.....	2	11	6	8	14
21–24.....	2	15	5	9	7
25–28.....	6	18	10	13	7
29–32.....	10	27	7	9	4
33–36.....	11	20	9	9	7
37–40.....	9	22	12	5	6
41–44.....	15	19	7	1	5
45–48.....	13	21	4	2	
49–52.....	6	13	4		2
53–56.....	15	9	2	1	
57–60.....	10	7	1		1
61–64.....	3	3	2	1	
65–68.....	2				
69–72.....			1		
No. cases..	107	198	76	81	95
Median ...	43	36	34	25	18

It will be noted that only 3 percent of the high-school seniors score above the median for the college seniors; and of this last group only 4 percent score below the high-school median. That is, the groups dealt with are clearly differentiated. Nevertheless the differences within each group, in emotional maturity, are striking. There is one college senior who appears to be a definitely less mature personality than the average high school senior girl. And one high-school girl seems to be more sophisticated than most college senior women. . . . The importance of further development of test materials in this field, and the great value which such instruments might have, are obvious.

The Larger Significance of the Study

Now as to the larger interpretation of the results. It is obvious that many factors affect an individual's reactions to the materials used. Thus the poorer students may fail to mark certain items in the interest test not because of lack of interest in the type of thing signified by those items, but simply because they know nothing about the items mentioned. That is, on certain items the test may function primarily as an information test. However, when the tests were constructed a special effort was made to keep within the area of common knowledge; it is believed that this was done for the most part.

The results are believed the product especially of two major factors, the "mores" of the social, economic, and, age groups from which the individuals came, and the emotional (and mental) age of these individuals. It is the possibilities which this study opens up as regards investigation of the operation of these factors which the writer wishes to stress, in closing. The results given in the previous two sections surely indicate that research along these lines is possible. The writer hopes shortly to obtain results from England and Scotland to compare the attitudes of students there with findings in this country. He plans, ten years from now, to cover again the problems dealt with in this paper, and see if social attitudes have changed. . . . There are a hundred and one problems in this total field, needing study. Possibilities, for work along these lines, are fascinating.

Summary

1. The paper presents results obtained with three "tests" dealing with moral attitudes, worries, and interests.

2. Results from 257 college men and 197 college women showed that (a) there were appreciable differences between the good students and the poor students, in their reactions to the various items of the tests, and (b) combination of those items showing most difference into a "differential unit" gave correlations with college grades about as high as were obtained between grades and score on a group test of intelligence.

3. Results from a total of 1734 cases from the sixth grade through college showed that (a) there are striking differences between different age groups, in reaction to these materials, with important sex differences; further (b) "maturity differential units" gave results suggesting that measurement of emotional development may be both possible and of practical value.

4. The importance of further studies in this total field is emphasized.

X

THE COLLEGE AND ADOLESCENT NEEDS

S. L. Pressey

In the introduction to this section it was pointed out that the college student had problems of vocational, social, moral adjustment and emotional and characterological development of which the college of a generation ago failed almost entirely to take account. And it was further emphasized that one of the tasks of the college is to bring the adolescent college student to an understanding of himself and his own problems. The college of the present day has in its curricula some courses (as in psychology, sociology, economics) that include material bearing on such matters. And personal contacts with instructors, and secretaries or deans, have always functioned more or less in helping students with such problems—though such service is not ordinarily considered part of the instructor's work, and is regulatory rather than constructive as it emanates from the dean's office. It was to obtain some notion as to how common such problems were, and how adequate present means for dealing with them, that this little study was undertaken.

The method of investigation was very simple and direct. To three beginning classes in psychology enrolling chiefly sophomores and juniors a blank was given having material of which the following section will serve as example:

> Have you, since coming to college, had any problems of social adjustment?
> Were you much troubled by these problems? Are they as yet solved?
> From what sources did you receive help in dealing with these problems?
> What do you think might be done, to help students with such problems?

There were seven such sections, the other six having to do with vocational problems, problems of adjustment with members of the family, problems of study and mental efficiency, worries because the student thought herself queer or abnormal in some way, conflicts with existing conventions, problems of morality and a general philosophy of life. The topics were chosen, on the basis of previous work and acquaintance with college students, as touching major problems of the average undergraduate.

The Findings

The results were obtained from exactly 100 women and only 18 men; the papers from the men were therefore discarded—the report from now on will deal with findings for the women only. The first question was as to the number of these young women reporting one, two, three, or more problems, the number reporting one, two or more problems as serious or much worried about, and the number having one or more problems still unsettled. The following table shows the situation:

TABLE V

Number of problems	0	1	2	3	4	5	6	7	Med.
Cases having problems	0	9	19	28	19	14	7	4	3
Cases having serious problems	12	20	30	19	8	9	2		2
Cases having problems not settled	17	25	22	16	13	3	4		2

This table shows that there was no student who did not report a problem of some kind while there were 4 who reported problems in all seven of the fields covered in the inquiry; there were 12 reporting no problem as serious but 2 reporting 6 such problems; 17 reported no problems as still unsettled while 4 were still troubled by six such anxieties.

It surely seems reasonable to conclude that the average college student is a person perplexed by various personal problems, and that most college students have problems for which they are not finding solutions. The natural next question was as to the comparative frequency, seriousness, and persistence of the different problems covered, and the sources of any help which these students may have received. The following table summarizes the situation. It includes

TABLE VI

Number, of 100 Women Undergraduates, (a) Reporting Personal Problems of Various Types, and (b) Reporting Aid as Received from Various Sources

	Voc.	Soc.	Fam	Stud.	Abn.	Conv.	Mor.	Av.
Have had problem	74	52	24	80	27	25	57	48
Serious	51	32	18	66	16	17	27	32
Not yet solved	41	24	15	57	16	16	32	29
Sources of help								
Classes	11	1	1	29	5		6	7
Conferences	21	1	1	19	2	2	5	7
Friends	23	26	4	5	9	4	10	11
Family	14	7	3	3		2	7	5
Books		1		7	2	1	4	2
Sorority		10				1	1	2
Church	1	2	1		1	2	1	1

all sources of aid mentioned more than twice for any one problem. Of these sources, "conferences" refer to individual contacts with college instructors, dean, secretary, or other university official. Contact with student pastors or such agencies or the Y.W.C.A. is included under "church."

Evidently, problems in all of the fields covered are common enough to make methods of dealing with them important. Evidently also, the college as such does not by any means always assist college students in meeting their personal problems. It must not be supposed, of course, that the college is responsible for the solution of all these difficulties in the lives of its students. Thus the delicate matters of moral attitude and a philosophy of life are possibly better handled by the student pastor, Y.W.C.A., or other similar individuals or organizations. However, one cannot escape the notion that our colleges might contribute more than they now do to the solving of many of the problems which are distressing the young people they are attempting to serve.[1]

Suggestions as to what might be done, to help students, were various. A rough classification, lumping suggestions on all seven types of problems, does however, bring out points of some possible significance. The most frequent suggestion (with a total of 79 mentions) is that there be some person—a confidential advisor or counselor—to whom students might go, who will listen to their difficulties, and who would have a broad understanding of student problems.[2] Apparently there is a certain distrust of Y.W.C.A. secretary, student pastor, dean of women, as individuals often interested rather more in the maintenance of the moral and social conventions than in the student. What is desired is a person or

[1] The question may be raised here as to whether the replies of the students are sufficiently reliable to warrant such conclusions. Undoubtedly the institution has contributed to the solution of problems in ways of which the students are not now conscious. But the fact that the students still feel many of these problems unsolved suggests that such contributions have by no means been adequate. And it is probable that a natural reserve in some cases brought students to reply negatively to questions about certain problems when as a matter of fact they were troubled by such problems.

[2] The total of 79 does not include 26 mentions of personal contacts with members of the faculty, although here also the idea seemed to be that the faculty member should act as an advisory expert. In total, the outstanding suggestion is for some sort of consultant service. . . . It is worth considering in this connection, whether the much discussed tutorial system may not be individualizing in the wrong direction. What a student most needs may usually be not individual consultation about problems of English political theory with an expert in government, but counseling about the student's own problems with an expert in student adjustment.

persons without special prejudice, and with appreciation of the student point of view.

The next most frequent suggestion (a total of 58 mentions) is for courses which should be informing regarding students' problems. Third (35 mentions) comes suggestions looking toward the development of a student social life which should be wisely planned for the socialization of the isolated or socially maladjusted individual.

Other suggestions were made, but they were less frequent and of less constructive value.

The Constructive Problem

Now a word as to the larger aspects of the subject. There is at present much discussion about and some trial of psychiatric service in colleges, for consultation with and treatment of peculiar or maladjusted students; that atypical individual, the student with a problem, is dealt with by the specialist in mental disease. This is splendid, as far as it goes. The fact seems to be, however, that all students have problems. And the matter appears to require not simply the addition to the old line academic organization of an accessory functionary, but a consideration of the total situation with reference to possible general realignments to meet the issue.

The fact seems to be this, that colleges have been interested in subject-matter rather than students. A certain reformulation of objectives seems needed. This would presumably lead to some reorganization of the curriculum, to make the first two years not primarily formal and preparatory but more informing and designed for immediate service to the student. Personnel having to do with student administration should be realigned in accordance with the changed point of view. And the constructive policies of an institution must have reference not almost exclusively to the classroom, but even more to the total college situation as an environment carefully planned for maximal service to the young people who have come to it.

Summary

The paper reports replies from 100 college women undergraduate students regarding certain personal problems, as of social adjustment, vocational choice, moral standards and a philosophy of life. Findings were as follows:

1. Every student reported at least one problem; the median number was three. All but 12 students acknowledged at least one problem as serious; the median student reported two

serious problems. And the median student reported two of her problems as still unsettled.

2. Analysis showed all seven of the problems covered to be common; the least frequent (difficulty in relations with members of the family) was admitted by 24 students.
3. Neither college classes nor personal contacts with members of the college staff were reported as assisting, to any very adequate extent, in the solution of these student problems.
4. The three most stressed suggestions for improvement of the situation were that there be (a) some counselor or confidential advisor to whom students might go, (b) courses informing students regarding such problems, and (c) the development of a social life for the socialization of the isolated or socially maladjusted student.

XI

HOW STUDENTS SPEND THEIR TIME

HELEN CORBETT MARTIN

The investigation began as an attempt to find out how much students actually do study. Indirect evidence of various types, and direct observation (the author has served as "house mother" in a sorority) made it fairly clear that many students spent very little time in study. Some such students obviously accomplish little or nothing; in other cases it appears that the student works much faster and more efficiently than the instructor supposes. There were also a few instances where students appeared to be working too hard. . . . The situation obviously needed investigation, in any effort better to adjust college standards to student needs and capacities.

It was clear, however, that direct inquiry of students as to time given to study would not be satisfactory. The average student would put down the time he thought his instructor expected him to devote to his work. Some other approach was necessary.

Such approach was found possible in connection with discussion of problems of personality in a large beginning course in psychology. The data were gathered by the writer, not the instructors—she simply went into the class room, told the students that she was gathering data for study of personality problems, to show the variety of interests of the college student, and asked them to coöperate by jotting down at once and turning into her a detailed account of what they had done for the past twenty-four hours.

The students seemed distinctly to enjoy this mild reminiscence, and the accounts for the most part bore every evidence of a reasonable accuracy. At least (as will appear shortly) there is little evidence of any "padding" of the time devoted to study. Further, it soon appeared that the data were of a larger significance than had been anticipated when the project was first planned. Some very interesting side lights on the life of the average college student were obtained.

In order to get a picture of the situation for an entire week, and still not impose upon any one group of students, the writer went into different sections of the course each of the five class days in

the week; on Monday twice as many sections were visited, half being asked to describe Saturday's activities and half the Sunday's doings. The data were gathered in March—perhaps the time, in the college year, of fewest distractions. A sample report ran as follows:

9-9:50 a.m. in Psychology class. 9:50-10 a.m. walked to Library. 10-10:30 a.m. talked with a friend. 10:30-11:50 a.m. worked in Library. 11:50-12:00 walked to lunch. 12:00-12:30 ate lunch. 12:30-1:30 talked and fooled around. 1:30-2:00 rode down town. 2:00-4:30 shopped. 4:30-5:00 rode home. 5:00-5:30 changed my clothes. 5:30-6:00 ate dinner. 6:00-6:50 danced and talked. 6:50-9:00 went to a show. 9:00-10:30 sat in "A's" with a crowd. 10:30-10:45 went home. 10:45-11:00 undressed and went to bed. 7:30-7:40 dressed. 7:40-7:50 ate breakfast. 7:50-8:00 went to class. 8:00-8:50 Spanish class. 8:50-9:00 walked to "B" Hall.

In tabulating results, amounts of time spent each day were grouped under the following heads: (1) recreation—including exercise, social affairs, and all the various forms of campus activity, (2) study, (3) classes, (4) work, (5) dressing, (6) sleep, (7) eating, and (8) miscellaneous—chiefly "fooled around," "just talked," "sat with the crowd on the veranda," etc. The number of students who furnished information was 113 for Sunday, 115 for Monday, 107 for Tuesday, 116 for Wednesday, 102 for Thursday, 113 for Friday, and 112 for Saturday.

Results of the Analysis

Perhaps the first item to be considered is the proportion of students indulging in each type of activity, each day. Everyone, of course, ate, slept, and dressed. The following table shows the percent of students engaging each day in each of the other activities mentioned.

TABLE VII

Percent of Students Engaging in Each Type of Activity, Each Day of the Week

	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Recreation	99	97	100	99	98	100	100
Study	12	88	89	90	100	11	45
Classes	0	94	100	96	100	95	4
Work	11	18	25	18	26	19	38

It will be seen at once that practically every student had some recreation every day. On Monday, Tuesday, Wednesday and Thursday, the majority of students do at least *some* studying. On

Friday and Sunday they evidently rest from their labors. On Saturday about half the students study, of whom two-thirds put in five hours or more. In other words most of those who study at all on Saturday, devote the day—or at least half of it—to this one thing; one suspects that they are the students who do all their work over the week-end. Finally, on Saturday over a third do remunerative work.

Table VIII, just below, shows the medians for the various activities during each day of the week.

TABLE VIII

MEDIAN NUMBER OF HOURS SPENT ON EACH TYPE OF ACTIVITY, EACH DAY

	Recreation	Study	Classes	Dressing	Sleep	Eating	Misc.
Sunday	4	0	0	1 0	9	1 5	8 5
Monday	4	3 5	3	.75	7	1 5	4 25
Tuesday	4	4	3	5	8	2	2 5
Wednesday	3	3 5	3	5	8	1 5	4 5
Thursday	4 5	5	2	5	8	1 5	2 5
Friday	6 5	0	3	5	8	1 5	4.5
Saturday	6	0	0	75	9	1 5	6 75

Evidently, the number of hours spent in recreation remains about constant through the week, but rises on Friday and Saturday. The variety of interests here appearing must be stressed. The students indulged in various forms of athletics, played various games such as bridge or pool, engaged in numerous activities, rehearsed playes, attended sundry committee meetings, went to movies, went shopping, took automobile rides, went on hikes, read, played sundry musical instruments, went to numerous social affairs. "Recreation" thus includes all the definite undertakings in which the students engaged of their own initiative because they enjoyed them. It is evident, however, that many of these activities are highly educative, and otherwise worth while.

Inasmuch as so few students studied at all on Friday, Saturday and Sunday, the median in each case is zero. The days showing the heaviest class schedules are Monday, Wednesday, and Friday; the days for the greatest study are Tuesday and Thursday. Evidently, Tuesday goes into preparation for Wednesday's lesson and Thursday into work for Friday; but when are Monday's lessons studied? The chronic complaint that students are rarely prepared on Monday seems justified.

Apparently, students spend most time dressing on Saturday, Sunday and Monday. Time at meals is constant. Sleep averages eight hours, with a bit more over the week end.

The last column seems largely a statement of wasted time—time spent "fooling around," "smoking," "killing time." Apparently on the days when the student has most classes he also thus fritters away more time, since he has less to prepare for the morrow. Over the week-end he so spends many hours.[1]

The extent to which some students vary from the median is sometimes very interesting and significant. Although the average student "recreates" about four hours a day (except Friday and Saturday) there are from 2 to 18[2] who "play" an hour or less a day, and there are from 5 to 87 who get six or more hours of recreation each day.

Although the median amount of study may seem low—a little over an hour for each lecture hour—there are from 6 to 29 students putting in six or more hours a day. On the other hand, aside from those who do no studying, 1 to 10 do an hour or less per day. All told, there seems to be little evidence that the average college student overworks.

There were from 8 to 19 students who attended five or more classes a day—presumably having laboratory hours. Those who worked to help pay their way varied from one hour a day to six, with the majority working three or four hours. There were many students—about a fourth—who spent only fifteen minutes a day in arraying themselves (a finding which is perhaps confirmatory evidence regard the few garments worn now-a-days) but some 3 or 4 students each day put in three or more hours. From 8 to 27 students slept six hours or less, while there were from 7 to 28 who slept ten hours or more. Most students seem to expend a reasonable amount of time at their meals, but there were from 5 to 10 who reported less than an hour a day eating and from 3 to 15 who put in three hours or more in eating-places.

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[1] The reader may have felt, throughout the paper, that undue confidence has been shown in the student's reports. Undoubtedly the figures are rough; undoubtedly some of the reports willfully misrepresent. But the clearness with which the students reveal their own short-comings (and other internal evidence) leads one to the conclusion that the directions did function in leading the students to a reasonably frank statement.

[2] The figures vary for the different days in the week. Here "2 to 18" means that the most leisurely day of the week showed only two students obtaining almost no recreation, while on the busiest day there were 18 who had one hour or less of play.

Conclusions

Two general features of the above results seem to the writer to stand out. In the first place, going to college is much more than simply attending classes and getting ready for them. Consideration of the daily life of the average student makes clear that the total experience is much more complex than this. An educational policy centered simply on the strictly academic elements in this total experience is, then, a policy very inadequate and one-sided.

The second point to be noted is this, that apparently the academic features of this total situation are not making vital appeal to the students. There is much wasted time.[3] And there is toward class work a perfunctory attitude—expressed partly by the relatively small amount of time devoted to study, and still more clearly by the immediate escape from academic labors whenever possible (zero medians for study Friday to Monday). The question is, then, as to the reasons for this attitude.

Various factors are undoubtedly involved, but certain causes seem rather outstanding. The first is, the writer believes, the gap between the interests, problems, and felt needs of the average underclassman and the formal and preparatory education which is served him.[4] The result is that much academic work becomes little more than an educational ritual from which the student escapes whenever possible. A second is correlative with this. The student finds that his adolescent nature demands many things, for healthy development, which are not provided by the college as such. In consequence, he turns away from the curriculum to various outside interests. And the total maladjustments of the situation cause a restlessness which interferes with consistent accomplishment. At least, these would seem factors in the situation. The data presented in this paper are anyhow to be regarded as symptomatic; and one must be careful to treat causes and not merely symptoms.

[3] This time may very likely in part go to conversation and intellectual intercourse of great value to the student's development. The indications are, however, that activities in these periods are for the most part neither highly intellectual nor otherwise of much worth. The student sits around, smokes, gossips, or talks sports. Often he says frankly that he is "killing time." . . . . Whether the college student so spends more time than the average individual might be questioned.

[4] The writer is reminded of a bit of verse of the "Cheerful Cherub" syndicated newspaper series:

I long to know a lot of things.
With curiosity I'm cursed—
But teacher tells me that I must
Complete my education first.

Summary

1. The paper presents data dealing with ways in which university undergraduates use their time. The investigation covered a week in March—a time when athletic and social distractions were largely minimal compared with most other periods in the school year. Reports were obtained from a total of 778 students, an average of 111 for each day in the week.

2. It was found that the average student confines his study time to four days in the week—Monday, Tuesday, Wednesday, and Thursday.

3. The actual use of his time, by the average student, makes definite the fact that going to college involves much more than going to classes and preparing for them; going to college is a very complex experience.

4. There are marked individual differences in use of time. In some cases there appears to be a real problem meriting the consideration of a student counselor or other responsible advisor.

5. It is suggested that college educational policies are centered too exclusively on the narrowly academic, to the neglect of the total educational situation in which the student actually lives, and that in consequence the curriculum is often in only formal and perfunctory relation to the student.

SUMMARY AND DISCUSSION REGARDING PROBLEMS OF EMOTIONAL AND CHARACTEROLOGICAL DEVELOPMENT

The college period is then a period during which striking changes in moral attitudes, centers of emotional stress, and interests, are taking place. Such factors influence greatly the academic success of the student. There are throughout the studies of this section[1] evidences of maladjustments of the programs and procedures of the college to this developmental process.

The section opens up perhaps the major problem of the college. If it is to accomplish what it should, it must greatly enlarge its vision of its relation to the young people with whom it deals; it must see as its function not merely the administering of information but the furthering of an adequate total development. How this is to be accomplished is by no means clear. Doubtless valuable suggestions can be obtained from the natural out-workings of college student nature in athletic and social activities. An earnest research approach should rapidly outline the situation. But at least certain results of any such change in the attitude of the college may be prophesied. If we can get the powerful drives of natural adolescent interest back of the classroom work, scholarship in our colleges can become a real and vital thing. If such development can be guided, the sending of a young boy or girl to college will cease, at last, to be an emotional and characterological hazard, and the college graduate may be in fact a man or woman of ideals, established in wholesome and wise attitudes toward the world in which he or she is to live.

[1] Better, throughout this volume; it is impossible to study the problems of higher education without chronically coming upon this difficulty of the average college in arriving at a broadly constructive (as distinct from a primarily regulatory) policy toward the emotional life and natural interests of the students.

SECTION FOUR

PROBLEMS OF PREVIOUS PREPARATION

INTRODUCTION—SECTION FOUR

PROBLEMS OF PREVIOUS PREPARATION

In the first section of this volume it was pointed out that deficiencies of previous preparation were not infrequently important causes (often *the* important cause) of difficulties in college work. It also turned out curiously enough that these deficiencies of preparation involved hardly at all those elements which the college stressed in entrance requirements (it was not found that college students were failing because of inadequacy in Geometry, for instance). In fact, the crucial deficiencies were found to be not in secondary but in elementary school preparation. These findings naturally suggest further investigation regarding the educational background college students bring from their public school work. The importance of recognition by the college of the conditions here indicated is surely obvious.

XII

THE ERRORS OF COLLEGE STUDENTS IN THE MECHANICS OF ENGLISH COMPOSITION

J. T. SEATON

It is a common matter of complaint among college instructors that college students have not mastered the elements of correct writing. Comparatively little seems to be known, however, as to the nature of the student difficulties or the important points of attack in attempts to remedy the situation. The present brief paper summarizes an effort to obtain some analysis as to nature and frequency of errors in the mechanics of composition made by college men and women, locate the important points for remedial instruction, and determine the extent to which such remedial instruction might be of general efficacy in improving matters.[1]

FREQUENCY OF ERRORS IN THE WRITING OF COLLEGE STUDENTS

The method of studying the problem was simple and direct. A large mass of writing by college students was collected, a total of 427,468 running words in all (a total of 621 different papers). This included examinations in history, examinations and special topics in philosophy, examinations in psychology, narrative compositions, and social letters. These compositions were very carefully gone over by trained workers, and all errors in capitalization, punctuation, grammar, and sentence structure were noted and tabulated. The first question is as to the total frequency of errors—the total size of the problem.

Errors were here (and throughout this study) summarized in terms of frequency per 10,000 running words; this gave a convenient method for comparison from one group of data to another. It was found that for this total mass of material the errors in capitalization averaged 23 per 10,000 words. The errors in punctuation averaged 111 per 10,000 words, in grammar 24, in sentence structure 49. For the total four fields, then, the average of errors per 10,000 words was 207 or about 2 errors per 100 words. Evi-

[1] The work here reported is part of a larger study dealing with errors in composition from the third grade through college.

dently the errors are not on the average extremely frequent but do aggregate to no inconsiderable problem.

The Types of Errors

Next a detailed study was made of the types of errors in each one of the four fields. The effort was to find the errors which were most frequent and toward which individual instruction should be directed if a rapid improvement of the situation was desired. The situation in capitalization was typical. It was found that three types of errors accounted in the total for 74 percent of all the errors. Per 10,000 words there was an average of 9 capitalizations of words which should not have been capitalized (the students tended to capitalize words dealing with important matters whether the capital was actually called for or not). In five cases per 10,000 words the capital was omitted at the beginning of the sentence (here were included also cases where a sentence division was needed but neither period nor capital was put in). There was an average of three errors per 10,000 words due to omission of a capital in mention of parts of the country such as *the South, the Great Northwest.* No other type of error occurred per 10,000 words more often than two times.

The situation in punctuation was slightly more complex, as would be expected in view of the fact that the greatest number of errors occurred here. The following table gives errors occurring more than two times per 10,000 words.

TABLE I

Period omitted at end of sentence	8
Semicolon omitted when needed in compound sentence	3
Dash used incorrectly	3
Commas not used to set off parenthetical element	30
Comma omitted between clauses of compound sentence	16
Comma omitted to set off subordinate clause preceding main clause	18
Comma omitted in series	3
Apostrophe omitted or mis-used to indicate possession	3

It is probable that the graders in scoring comma errors were somewhat overly strict, but doubtful if totals would be reduced very much by more lenient grading. The above errors account for 76 percent of all the errors in this field.

The situation in grammar was simple. Confusion (as *to, two, too*) headed the list with a frequency of 6. Next (with a frequency of 5) came errors in tense forms of verbs, the common error being

the omission of *ed* in such words as *asked.* There was failure of the verb to agree with subject in number in four cases, and omission of the *ly* in adverbs in three cases. These four errors account for 75 percent of all the grammar mistakes.

Errors in sentence structure averaging more than 2 for 10,000 words were as follows:

TABLE II

Run-on sentence	16
Pronouns with no antecedents or indefinite antecedents	10
Fragments used as sentence	9
Omission of words	4
Redundancy and repetition	3

The above categories account for 86 percent of the errors in this field.

Briefly, the 20 errors account for a total of some 78 percent of all the errors in the mechanics of English composition.

Variations in Type and Amount of Error from One Type of Subject Matter to Another

The next step was a comparison of errors from one type of subject matter to another. The following table summarizes the situation.

TABLE III

Frequency of Errors Per 10,000 Words

	Hist	Phil.	Psych.	Narr.	Letters	Average
Capitalization	39	8	36	5	26	23
Punctuation	177	65	151	48	113	111
Sentence Structure	25	29	108	23	62	49
Grammar	18	15	37	14	37	24
	259	117	332	90	238	207

It will be seen that there are variations that superficially appear rather important and striking. Close study indicates, however, that these variations are probably of little significance. The important feature apparently is haste; the history and psychology examinations were both written under pressure. Thus the psychology papers show twice as many failures to capitalize at the beginning of a sentence as the average, and frequent omission of the period at the end of a sentence. Commas are also more frequently omitted. Fragments are used as sentences—a common enough trick

in examinations—and pronouns used in a vague way. In the field of grammar the dropping of the *ed* from past tense and past participle of regular verbs is to be considered due to the same cause. Aside from the above variations detailed analysis of differences shows little of importance (the frequency of failure to capitalize *the South* or *the Great Northwest* on history papers is so obvious a special element that it need hardly be mentioned).

Discussion

Little discussion of the above findings seems necessary. The sad fact is that these students have had drill upon these subjects for the most part from the third grade, and still errors are frequent. The encouraging element is, that since errors are of few types, elimination of them by concentrated effort should be possible. The writer feels that failure to eliminate these errors earlier is a result of lack of such discrimination of the frequent from the infrequent errors; instead, the average English teacher has scattered her efforts over a great variety of topics with the result that she has accomplished very little on any.

Summary

(1) The paper reports a count and analysis of the errors in the mechanics of English composition (capitalization, punctuation, grammar, and sentence structure) appearing in the written work of college students. A total of 427,468 running words were gone over (621 papers were studied, in all). The materials included examinations in two subjects, themes of various types, and letters.

(2) For the total mass of writing, errors were found to average 207 per 10,000 words. Errors in punctuation were most frequent.

(3) Analysis showed that the bulk of the errors were made up of a few recurring types. Twenty simple types accounted for over three-fourths of all the errors made.

(4) Variations from one type of writing or subject matter to another seemed due primarily to differences in haste with which the different pieces of writing were done.

(5) It is argued that by concentration of effort on the frequent errors, much can be done to remedy the situation.

XIII

THREE SAMPLINGS REGARDING TAKEN-FOR-GRANTED PREPARATION FOR COLLEGE WORK

S. L. Pressey

The seriousness of the situation suggested by the data on the following pages is surely obvious; the writer is convinced that no little of the stumbling and blundering about of the average college student in his work in science and the languages is due to such simple and elementary deficiencies as are here suggested. . . . But discussion can best come after the data have been presented.

Deficiencies of College Students in the Fundamentals of Grammatical Terminology

As one result of a series of investigations regarding errors made in composition and grammar by students from the third grade through college, a list of the minimum essentials in grammatical terminology was made. This list consisted of those terms which seemed necessary, for instruction which should eliminate the common errors in written work, as determined by these investigations. This minimal list contained thirty-eight such functionally important grammatical terms.

A test was now constructed covering these terms—and covering them in such a way as to call for a practical and functional use of them rather than simply a formal definition.[1] The following sample items from the test will make clear the general plan.

1. Underline the sentence: The team which won the game. The boy and the little dog. After everyone went home. It snowed yesterday.
7. Underline the subordinate clause: Elsie was away when you called, but John was there, and came out to see us.
13. Underline the antecedent of the pronoun: At once Will gave the woman his seat.
30. Which pronoun is in the first person? You us they he
35. Which verb is in the present tense: We were cold. They ran home. He will come. She sees you.
36. Which verb is regular? See do talk write.
38. Underline the present participle: Reaching the shore, they shouted for joy.

[1] The writer is indebted to Miss Lilly Heinrich for her intelligent and capable assistance in this work.

This test was given to a total of 102 college students, of whom only eight were freshmen. In other words, practically all of the group had had the required freshman English course, and some work in foreign language. The following table summarizes the results.

TABLE IV

TERMS COVERED IN FUNCTIONAL GRAMMAR TEST, WITH PERCENTS OF COLLEGE STUDENTS FAILING EACH TERM, FOR THOSE TERMS FAILED BY FIVE PERCENT OR MORE

The Sentence:
Sentence (8), interrogative sentence, exclamatory sentence, compound sentence (7), complex sentence (47), subordinate clause (51), main clause (11), subject, object, modifier, antecedent (18), agreement (16), appositive (10).

Parts of Speech:
noun, pronoun, verb, adjective, adverb, conjunction, preposition (16)*, interjection.

Nouns and pronouns:
proper and common noun (5), possessive case (5), nominative case (10), objective case, first person (29), second person (10), third person (9).

Verbs:
Plural, singular (7), past tense (14), present tense (17), regular verb (34), irregular verb (15), present participle (20), past participle (25).

* This percent is probably due to the fact that the item (Underline the preposition: The dog started to run into the house) was both tricky and fundamentally not sound, in using the "to" of an infinitive as a confusion word.

Certain comments remain to be made. Doubtless the somewhat artificial nature of the test may have confused, occasionally; the results may exaggerate the situation. It is also to be mentioned, however, that these students had (with only a few exceptions) had some little college work in English and foreign languages. At the time when they most needed their public school grammar—at the beginning of their freshman English and foreign language work—their knowledge of these terms was probably still less. The writer ventures the hypothesis that an important element in freshman difficulties with courses in English composition and in French, Spanish, or German, may be deficiency as regards the fundamental terminology of grammar and syntax.[2] The topic should, he believes, be a matter for explicit and careful consideration, by teachers of such courses.

[2] It must be remembered in this connection that the test covered only very important terms. Analysis of a very widely used, and exceptionally brief and straight-forward, college manual in English composition shows a total of 213 technical terms.

Blank Verse and the College Student

For a number of years the writer has been much interested in the matter of sensitivity to verse form as it relates to selection and placement of materials in courses in English literature. In particular it was his belief that, for the average high school student and for many college students, blank verse was (because of the lack of rhyme to "punctuate" the blank form) little more than inconveniently printed prose. It further seemed reasonable to suppose that the matter might readily be investigated, with a little ingenuity. The following procedure was, therefore, worked out.[3]

Two 31 line passages from one of Tennyson's "Idylls" were chosen, as being relatively free from proper names or peculiarities of versification which might cause trouble to the average reader, and in each, 16 of the lines were tampered with. To four lines one entire foot (two syllables) was added; four had added one unaccented syllable; four were changed so as to eliminate one foot, and four changed to eliminate one syllable. The change in each case was very carefully worked out to affect the meaning very little if at all; it was the intention that the change should affect only the meter. The last ten lines of one passage is reproduced below, with the lines as changed shown in parentheses. The directions to the students were simply that they should find the lines in which the meter had been changed, and check them.

In this poor gown he bade me clothe myself,
(In this poor gown he bade me clothe myself again,)
When now we rode upon this fatal quest
(When now we rode upon this quest)
Of honor, where no honor can be gained:
And this poor gown I will not cast aside
Until himself arise a living man,
(Until himself arise a living man again)
And bid me cast it. I have griefs enough:
(And bid me cast it. I've griefs enough:)
Pray you be gentle, pray you let me be:
(Oh king, pray you be gentle, pray you let me be:)
I never loved, can never love but him:
Yes, God, I pray you of your gentleness,
(I pray you of your graciousness,)
He being as he is, to let me be.

[3] The writer wishes to express his obligations to Professor W. D. Armentrout of Colorado State Teachers' College, and to Miss Margaret Bargar, for their coöperation in the development of tests and methods and other assistance in the investigation.

The tests were given to two groups, both of college summer session students. The main group consisted of 79 students, mostly freshmen and sophomores, in the beginning course in psychology. The second group (used to check the discriminatory worth of the test) consisted of 25 students in an advanced course in English dealing with versification, made up largely of English teachers. The subject of blank verse had not been specifically taken up in this course at the time the test was given. There had not thus been any specific training regarding this verse form, but the members of the group were presumably sensitive to verse forms and widely read in English poetry.

In scoring papers the individual was credited with one point each time he checked as wrong a line which had been tampered with and each time he let alone a line which had not been mangled. The highest possible score was thus 31 points. The median score for the 79 underclassmen was 17—hardly more than might be obtained by chance! Analysis showed that lines in which the extreme step had been taken of adding one entire foot (two syllables) were not marked as wrong by an average of 65 percent of these students. That these low scores are not due to some defect in the test rather than in these students is shown by the relatively good scores made by the students in the advanced English course. The median for this group was 24.[4] And it is further to be noted that there was only one member of the English class who scored below the median for the underclass group. There were 12 percent of the underclassmen who graded above the median of the English class.

Presumably too much should not be made of this somewhat bizarre test and somewhat meager findings. However, the writer cannot but feel that the results are sufficiently striking at least to raise the question as to the value now obtained from the reading, by the average college student, of much which he is now asked to read in English classes. If the situation *is* now unsatisfactory then two possibilities are presumably open. Either less of such material should be assigned to college students, or there should be more attention to training in the understanding and appreciation of verse forms. Perhaps the probability is that both adjustments should be made. The situation surely needs study.

[4] That it is no higher is probably attributable to the fact that some of the lines in which there was addition or subtraction of only one syllable could perhaps be considered within the legitimate irregularities of the verse form. However, the record of the English class is by no means ideal. Thus an average of 44 percent of this special group, failed to mark lines with two extra syllables as wrong.

A Striking Weakness in Background for College Science

Chance inquiry by the writer in one of his classes indicated surprising ignorance concerning common units of measure. A minor investigation was therefore made, to determine (a) actual need for such information in a college science course, and (b) the amount of such information actually possessed by students who might take such a course.

Data regarding information about units of measure in physics was obtained by going over a college text in physics and noting all units, and the frequency of appearance of each. It was found that units of measure appeared 4111 times in all, 2738 times in the text and 1373 times in the problems. A total of 74 *different* units were mentioned in the text, and 46 in the problems. For the entire book, there were 11 units mentioned only once; 43 were mentioned ten times or more. It was evident that, for study of this text, familiarity with certain units of measure was highly desirable.

Do students coming to college courses in science have such acquaintance? With some half dozen very common units in the English system (*inch, foot, yard, pint, quart, pound*) it would seem possible to assume adequate familiarity. At the other extreme is a group of units such as *coulomb* and *erg,* which are obviously subject-matter of the course and proper content for it, though very possibly inadequately dealt with, and a problem of technical information. Between these extremes are the less common units of the English system (as *ounce, rod*) the units of the metric system, and certain miscellaneous terms such as *degree*—a variety of measures, which are usually taught in the public schools and are commonly assumed by the physics teacher to be known, but which might be unfamiliar. It seemed worth while to obtain some information on this point. A total of 126 college students (mostly sophomores and juniors) were, therefore, asked to define, in any way they could, 20 such units. The following table shows, for these measures, (1) total frequency of mention in the book and (2) the percents, of the 71 students who had had no high school physics and the 55 who had had such training (none of the 126 had taken college physics), who were unable to give evidence of understanding of these units.[5]

[5] Grading was liberal. Standards of grading, and the extent of the ignorance displayed, will be made clearer from the following examples: acre—one square mile; 144 square feet; a unit of distance, 160 making a mile; 2½ square miles: radius—measurement in the center of a sphere; ½ of a circle; the measurement from the center of a circle to its diameter; the distance around; the center of a circle: bushel—8 pecks; the standard way of selling crops; a measurement of dry weight: peck—a measure of solid weight; 2 quarts; a

TABLE V

NEEDS AND KNOWLEDGE—ACQUAINTANCE WITH UNITS OF MEASURE INVOLVED IN COLLEGE PHYSICS

	Mentions in Book	Percent of Students Not Knowing Terms	
		H. S. Physics	No Physics
rod	1	62	75
mile	66	36	39
gallon	11	16	18
peck	1	36	51
bushel	4	31	37
ounce	9	24	29
ton	11	25	35
acre	1	84	94
radius	29	18	39
second	14	67	76
minute	2	65	79
degree	114	64	79
millimeter	26	53	63
centimeter	395	47	62
meter	82	64	83
kilometer	3	67	86
milligram	2	53	75
gram	210	89	96
kilogram	53	67	89
liter	2	75	85
Average	52	52	64

The number of cases is, of course, small; and the method was rough. But it would at least seem possible to conclude that the situation was—not ideal. Careful investigation of such problems of background would certainly seem warranted.

IMPLICATIONS OF THE FINDINGS

Each bit of data dealt with in this paper might by itself seem of comparatively negligible importance. But when a number of samplings agree in suggesting such deficiencies in background for college work the situation appears more serious. And searching

measure of volume such as potatoes: gallon—4 pints: ton—the largest measure of bulk: minute—a mathematical measure, as 8 feet and 3 minutes; used to measure longitude; part of an inch: mile—352 feet; 11500 feet; longer than a rod; 16 rods: degree—a small part of a whole; a measure of weakness or strength; a unit of atmospheric pressure; smallest unit of distance measurement: rod—3 and ⅓ feet; 330 feet: millimeter—1/100 meter; 1000 meters; an English measure of distance with reference to our mile: centimeter—1/10 meter; a tiny unit in an inch; 100 meters: meter—27 inches; about 3 miles; an English unit of length: milligram—1000 grams; 10 grams: gram—a term in weighting used in school work: kilogram—a million grams: liter—a unit of distance. Five students put down the metric system as the English system. Careful questioning traced this idea to tables titled "English Equivalents."

investigation to determine (a) the details of background actually needed in college, (b) actual acquaintance of college students with this needful background and (c) practical and efficient means for remedying deficiencies, is at once suggested.

The first and third sections of this paper include illustration of two ways in which needed background may be determined—weaknesses in a tool subject may be located, or college textbooks may be analyzed. A variety of approaches to this problem are presumably desirable. Tests more or less formal (as illustrated in all three sections) are the natural way of investigating actual deficiencies. Once individual deficiencies are located the remedial work might proceed in various ways. The writer would suggest self-instructional practice exercise material as most economical and efficient in dealing with a majority of such problems. He is inclined to believe that most of these deficiencies will yield readily, in individuals of college student level, to efficient direct attack. Probably (to put it in crude terms of dollars and cents) direct attention to such handicaps will prove in any case less of an instructional expense than the dragging inefficiency in college subjects which results if these handicaps are not removed.

Summary

The paper summarizes a somewhat random sampling as to the foundations upon which the average student attempts to build his college course.

1. A test covering the 38 grammatical terms believed of most fundamental importance showed many college students grossly ignorant concerning very elementary matters of grammar and syntax. Thus 51 percent of students above freshman level failed to identify the subordinate clause in a complex sentence; 34 percent did not distinguish an irregular from a regular verb; 25 percent did not know a past participle.
2. A test requiring the "spotting" of blank-verse lines from which as much as two syllables had been taken away, or to which as much as two syllables had been added, showed results for the average student little better than might be obtained by chance.
3. Analysis of a college text in physics showed certain units of measure very common. It was found that about most of these units college students lacked definite information. The metric system was almost unknown, and about even such units as "mile," "gallon," or "bushel" there was gross ignorance, in many cases.

XIV

THE STANDING OF COLLEGE STUDENTS IN TWO ELEMENTARY SCHOOL SUBJECTS

H. J. Arnold

During the greater portion of the average American child's public school career (about seven years) he receives a large amount of instruction and drill in arithmetic. In high school he suddenly drops all this work except as he maintains practice in courses in science or high school mathematics—and excepting as the ordinary transactions of everyday life involve arithmetic, as in making change. In college the individual may suddenly find no small acquaintance with arithmetic required, as in physics or chemistry, or certain commercial courses. There is some little evidence to indicate that students doing poor work in such college courses are very often in trouble very largely because of deficiencies in arithmetic. Under such circumstances it seems of no little importance to determine what arithmetical abilities (or disabilities) the general run of college students do have. The first section of this paper deals with this somewhat distressing topic.

The most important skill developed in the elementary school—and the *sine qua non* of success in college work—is, of course, ability to read. It has been one of the striking educational discoveries of recent years that the elementary school may fail disastrously to develop the subtle skills involved in ability in "silent reading." Investigation regarding the "silent reading ability" of college students thus seemed also highly desirable, in any effort to study the educational equipment which these young people have available, in their wrestling with college curricula. The second section of the paper touches this complex and difficult problem.

Arithmetical Abilities—and Disabilities—of College Students

In order to obtain information regarding the college student's arithmetic, a complete set of Monroe's Diagnostic Tests in Arithmetic was given to a total of 83 under-classmen in a certain Ohio college. The tests cover work all the way from simple addition such as $4 + 7 + 2$ to handling of common and decimal fractions. The

following table gives first the type of arithmetic work covered in each test, and then shows the percent of the total group of 83 students scoring below the norm for eighth grade children on each test, the percent scoring below the fourth grade norm for those tests easy enough to have fourth grade standards, and the percent scoring zero.

TABLE VI

PERCENTS OF COLLEGE STUDENTS (a) SCORING BELOW THE EIGHTH GRADE NORM, (b) SCORING BELOW THE FOURTH GRADE NORM (AVAILABLE FOR FIRST ELEVEN TESTS ONLY) AND (c) MAKING A ZERO SCORE, ON THE MONROE DIAGNOSTIC TESTS IN ARITHMETIC

Tests	Percent below Gr. 8 Norm.	Percent below Gr. 4 Norm.	Percent of "0" Scores
Tests 1-11: operations with integers			
1 Addition (4+7+2)*	4		
2 Subtraction (37—5)	19	6	5†
3 Multiplication (6 × 6572)	28	14	4
4 Division (8) 3840)	18	5	2
5 Addition (5 4—place numbers)	17	8	1
6 Division (82) 3854)	50	5	1
7 Addition (columns of 13 digits)	15	5	
8 Multiplication (36 × 4857)	27		
9 Subtraction (739 − 367)	9		
10 Multiplication (37 × 560)	36	11	
11 Division (47) 27589)	24		10
Tests 12-16: operations with common fractions			
12 Addition (⅙ + ⅓)	26		6
13 Subtraction (¾ − ⅖)	28		7
14 Multiplication (⅔ × ¾)	21		18
15 Addition (⅙ + ⅗)	29		7
16 Division (⅔ ÷ ⅛)	40		18
Tests 17-21: Multiplication and Division of Decimal Fractions			
17 Division (.03) 16.2 Ans: 54)**	44		20
18 Multiplication (.7 × 657.2 = 46004	6		1
19 Division (.4) 148. Ans: 37)	43		10
20 Multiplication (.62 × 487.5 = 302250)	6		
21 Division (.47) 2758.9 Ans: 587)	20		6

* To save space, some of the examples, are printed in the table in somewhat different arrangement from their actual appearance in the test; so the test shows these three digits in column.

† The zero scores in test 2 appear due to failure to see that test 2 was subtraction, not addition like test 1. There seem to be no other places where irrelevant circumstances have entered into the score.

** On tests 17-21 the problem is simply to place the decimal point.

The average for all tests shows 24 percent of the students scoring below the eighth grade average. Results from test to test are the important findings to keep in mind, however.

Perhaps most striking is the difficulty these students have with division. Thus the four tests on which 40 percent or more of the students average below the eighth grade norm are all tests in division. Zero scores average over twice as common in division as in multiplication, the next most difficult of the fundamental operations. Doubtless there are various reasons for the low scores on these tests. Division, of course, is difficult. It is a process little used in everyday life, as shown by various analyses of functional arithmetic. It is important to note, however, that in work in science, division is not uncommon.

As has been said, multiplication appears next most troublesome. The two outstanding difficulties here seem to be carrying, and confusion of addition and multiplication, in fractions. In addition and subtraction, handling of fractions is the outstanding problem, the trouble, of course, centering around the handling of the common denominator.

The question remains as to the extent to which disabilities in arithmetic are confined to a few individuals, or scattered through the group. Table VII throws some light on this matter.

TABLE VII

NUMBER OF STUDENTS MAKING 1, 2, 3 OR MORE ZERO SCORES ON (a) TESTS 1-10 (OPERATIONS WITH WHOLE NUMBERS) (b) TESTS 11-16 (COMMON FRACTIONS), (c) TESTS 17-21 (DECIMALS) AND (d) ALL TESTS*

No. of Zeros	Whole Numbers	Fractions	Decimals	All Tests
6				1
5				1
4		3		6
3		1		4
2	2	8	6	11
1	11	16	15	20
Total cases	13	28	21	43
Total zeros	15	47	27	89

* The four zeros on test 2 have been omitted for the reason mentioned in note 2 of Table I.

It shows the number, out of the 83 students, who made a zero score on one, and on two, of the tests in the operations with whole numbers—and so on. It will be seen that the largest number, 47 or over half, of the zero scores were made in fractions, that 28 stu-

dents (31 percent) failed completely on at least one test in fractions, that 3 students made zero on four out of the five fraction tests. Evidently a few of the students were almost completely at a loss in fractions.

The last column shows that 43 (over half) of all the students failed to make any score on at least one test. Evidently difficulties in arithmetic are rather widely distributed through the college population. There are 8 students who scored zero on four or more tests. These cases are obviously severely handicapped for any college work in which arithmetic appears.

The "Silent Reading Ability" of College Students

Ability to obtain meaning from the printed page is an exceedingly complicated thing. Measurement of the ability is correspondingly difficult, and any analysis, even to the limited extent exemplified in the treatment of arithmetic in the previous section, is almost impossible with present tests. Under the circumstances, it was decided simply to give a general scale and obtain a gross standing, again in terms primarily of eighth grade averages.

The Monroe Revised Silent Reading Test for grades 6-8 was finally decided upon. Briefly, this consists of a total of eighteen short paragraphs, each followed by a question upon the material in the paragraph. The "comprehension score" is the number of these questions answered correctly, and the "rate score" the number of words read per minute. How do college students do these simple reading tasks, as compared with grade school children?

Of the total group, 7 percent score below the eighth grade median in comprehension, and 30 percent so score in rate. In view of the somewhat elementary and special character of the reading tasks set by the test, not too much should be made of these results. More strikingly low results would seem worth further consideration, however. Thus one case scored at the fifth grade norm in comprehension; and in rate there were two cases at fifth grade level and one at fourth grade. In these cases, at least, there is again the suggestion of deficiency in a "tool" subject such as might seem likely to handicap, in college work.

The Solution of the Problem

There are, then, in our colleges students who show very serious deficiencies in such essential tool subjects as arithmetic and reading. What should the colleges do about it? Certainly not simply blame

the elementary schools—and expect the students, somehow, to make up their deficiencies. The elementary schools are improving themselves about as rapidly as is possible (are much more active in this respect than most colleges). And the students very often do not know what the real nature of their trouble is. The problem is a college problem; and the colleges should make some effort to deal with it.

The writer suggests that the colleges do two things. (1) They should give tests in these tool subjects either to entering students or, as in the case of arithmetic, at the beginning of such courses as involve much use of the tool subject in question. Such tests will, as has been shown in the previous section, locate the cases of marked deficiency, and make clear the situation. (2) The students who need help should receive it. This does not mean that the college should give a course in elementary school arithmetic. It is important to realize that in arithmetic, at least, it should be very easy to help these students. Thus, most students having trouble with division of fractions will find the total process coming back to them, once they are reminded that the divisor is inverted; a little practice will then re-establish the ability to deal with such easy problems. Ability to place the decimal point, in division of decimals, should be revived and established with no more trouble. Even the somewhat complicated manipulations of long division should be easily habituated once more by college students, with a little specific help on the crucial difficulties, and a little practice. Difficulties in silent reading are, of course, more difficult to get at and to remedy. However, the work with probation students at Ohio State University shows that much can be done in this subject also. In short, the writer suggests that each college should have an "educational diagnostician," who should diagnose and prescribe for educational ills. He is convinced that, with such a service, college failures would be much less frequent, and the general level of work appreciably raised.

Summary

1. The paper deals with the abilities—and disabilities—of college students in arithmetic and in silent reading. A total of 83 students were studied, using the Monroe Diagnostic Tests in Arithmetic, and the Monroe Revised Silent Reading Test.

2. In arithmetic it was found that an average of 24 percent of the college students were below the eighth grade norm; in opera-

tions with whole numbers there was an average of 5 percent below the fourth grade norm. Over half of the students failed completely (made a zero score) on at least one test; 10 percent of the group failed four or more of the tests. In reading, one student was found at fifth grade level in comprehension, and three were at this level, or below, in rate.

3. It is urged that colleges shall take steps to locate and aid students thus suffering from deficiencies in the "tool subjects"; and it is emphasized that rehabilitation of college students in such matters should be very easy. It is suggested that a college "educational diagnostician" could do much to prevent failures, and raise the general level of college work.

SUMMARY AND DISCUSSION REGARDING PROBLEMS OF PREVIOUS PREPARATION

Many students thus (a) make over and over again elementary mistakes in the mechanics of English composition, (b) lack such a minimal acquaintance with grammatical terminology as would seem essential for any study of language, (c) appear to have almost no sense for blank verse as a verse form, (d) are grossly ignorant regarding units of measure common in college science courses, and (e) test as low as the fifth grade in the fundamentals of arithmetic and in reading. There is evidently warrant for a thorough study regarding necessary preparation and background for college work. And the question is, more specifically, as to how the total problem shall be attacked.

Presumably, the first step (1) should be to determine empirically and specifically what actually are the important elements in preparation for college (in sharp distinction, be it noted, from the elements college catalogues say are necessary). What arithmetic, for instance, is necessary to handle the first course in chemistry? What formal grammar does one need for the study of French and German? What geography do students in history courses really need? And so on. The next step is naturally (2) to formulate tests or other materials so that the adequacy of a student's mastery of these important elements of preparation can be readily determined. This should be, as educational undertakings go, a relatively simple affair. Finally, there should be (3) a development of means (as practice exercise material, for example) by which inadequacies of various types may be most successfully remedied.

Evidently very extensive reconstruing of the total problem of preparation for college, and of entrance requirements, is suggested. It should also be clear that with such information as is suggested above, and with the tests and diagnostic schemes, and carefully developed methods for remedying deficiencies, above suggested, an "educational diagnostician" in a college should be able to do remarkable things in the way of educational rehabilitation of many students.

SECTION FIVE
PROBLEMS OF TEACHING

INTRODUCTION—SECTION FIVE

PROBLEMS OF TEACHING

The writer was so fortunate during the past summer as to have a leisurely breakfast at a vacation resort with a decidedly capable college president. The conversation touched upon the inefficiency of college teaching—as is usual when a college administrator speaks of the things which are on his mind. This administrator appeared to have one simple way of progressing with this problem. He picked instructors who had personality. As though a solution of educational problems could come about in such fashion!

It is to be noted in the first place that this college administrator seemed to have no definite ideas as to what made good teaching and what were the faults of bad teaching; he could not itemize this or that skill which the candidates should possess. The teaching act was apparently to be accomplished successfully as a result of social charm and enthusiasm. It is to be noted in the second place that there was apparently no effort (at least not of a serious and systematic nature) to help the teacher who was now serving the institution to improve his teaching. Apparently there was the notion of a certain pre-ordination as regards teaching skill. Finally it is to be noted that there was no mention whatever of the desirability of obtaining faculty members who had been trained for teaching. That there could be training for college teaching simply had not come within the area of consideration. And when the topic was broached there was obvious skepticism as to whether a college teacher could be trained. Teaching ability was a gift, which some people had and some did not.

Well—the following papers attempt to approach the whole problem in a very different way. But before turning to them there is one further point to be noted—and a point which, also, the college president had not considered. The writer is convinced that many of the difficulties, in connection with the functioning of our colleges and universities, which are charged to the account of poor teaching are really nothing of the sort. Perhaps most often the difficulty is with the curriculum; the students are asked to take courses which they sense as useless and in which they consequently refuse to be

interested.[1] But in general whenever there is something not as it should be (irrelevance of entrance or prerequisite requirements to needs, hypertrophy of required courses, a curriculum planned by backward-looking and ancestor-worshipping educational "fundamentalists," some cancerous athletic or social growth) the difficulty is most likely to appear in the classroom and to be charged to poor teaching.

[1] In fact one might say that under these circumstances the better the teaching the worse the situation was; the "inspiring" teacher might bring the students to waste time upon such courses when they might better spend their time elsewhere.

XV

RESEARCH ADVENTURES IN UNIVERSITY TEACHING—AND A RESULT*

S. L. AND L. C. PRESSEY, AND HELEN CORBETT MARTIN

The two investigations reported in this paper were, chronologically, the first, of the studies in this volume. One of the writers had recently gone from a primarily research to a primarily teaching position, in which he had general charge of a required course in educational psychology—a course given by several instructors, and with an enrollment around 700. In developing such a course certain problems naturally arose. Old habits persisted, and he attempted a research approach to certain of these problems. The present brief paper is a summary of two pieces of work which were the first results of this effort. There is added a section giving certain rather striking outcomes of changes made in the above mentioned course, on the basis of these investigations.

Two problems appeared immediate and outstanding. One was as to the amount of work which should be required in the course; the different instructors must needs have some common policy in this matter. The other was as to essentials of teaching method, which should be followed by all instructors.

REGARDING THE OPTIMAL READING LOAD OF UNIVERSITY COURSES

The investigation really began with an inquiry, two years previous, regarding uses which students made of arithmetic (the inquiry was in connection with incidental discussion of objectives in arithmetic). The instructor was startled at the number of students reporting calculations as to the time needed to go over a reading assignment, and still more startled at the rapid rate of reading. It appeared not uncommon for students to read 35 to 45 pages an hour. Investigation of the amount of reading required in various college and university courses revealed the fact that in courses which were primarily reading courses the average number of pages per

* The first two sections of this paper were first published, in slightly different form, in *School and Society*, Vol. 20, No. 516, November 15, 1924. The writers wish to acknowledge their obligation to the editor, Dr. J. McKeen Cattell, for his ready permission to reprint this material.

lesson might average as low as five. The time per day taken by the average student to prepare for such a class would thus figure as eight or ten minutes. Inquiry of students in several institutions, regarding this conclusion, indicated that it was essentially correct. An investigation regarding the proper reading load seemed desirable, as one project in the effort to develop the course in educational psychology.

The first experiment had to do with rate of effective study. One of the instructors in this course turned her recitation hour into supervised study hour one day each week for three weeks. The class (of 54 students) was divided into two parts, equal as regards average and distribution of intelligence. One half of the class (the control group) each day was given 25 minutes to study 17 pages, spent the next 15 minutes writing an outline of this reading—the book being closed—and the following day took a brief objective quiz on the matter thus studied. The other half of the class (the experimental group) worked, in another room, on the same 17-page assignments and began with the same allowance for study—25 minutes. However, the next study period was 20 minutes, and the last was cut to 15 minutes. Time for writing the outline was 15 minutes throughout, and the same quizzes were given, in the same way and at the same time, as to the control group. Optimum study period was determined by comparison of experimental and control groups as regards grades on both quiz and outline. Findings may be summarized shortly by saying that 20 minutes' reading time on 17 pages was found superior to 25 minutes, and that 15 minutes was only slightly inferior to 25.[1] The readings were from the text in

[1] The average scores on the three tests were for the control group 6.5, 7.1 and 4.2 points, and for the experimental group 6.8, 8.9 and 4.2 points for the twenty-five, twenty and fifteen minute periods. Thus the experimental group appeared slightly superior (in spite of equating on the basis of intelligence). Comparatively, the experimental group did best on the twenty minute period and about as well on the fifteen minute period as on the twenty-five minute period. The outlines were very carefully graded on a scale of 0-10 by an assistant who knew nothing of the experiment, and were given to him in such order that it would seem impossible for any constant errors to operate. The grades for the control group ran 5.6, 6.2 and 3.4; for the experimental group the figures were 5.8, 7.2 and 4.6. For this immediate recall (it will be remembered that the outline was written immediately after the reading, whereas the quiz was given the day following) the fifteen minute period thus appears comparatively the best. . . . These findings are, of course, of no great reliability, but it seems not entirely unreasonable to conclude that the shortened period (17 pages in twenty minutes) did no harm. At least there is in the method a suggestion of procedure for investigation of reading and study problems among college students.

educational psychology (Starch) and were believed to be representative in difficulty. The students were warned not to study outside of class on the experimental days, were (as a further safeguard) required to leave their books in the office on these days . . . and controls were in other respects careful. In other words, the findings are believed of some rough significance and applicability to the course under consideration.

It was concluded, on the basis of this experiment and such inquiries as have been mentioned above, that students could fairly easily, in educational psychology, cover 20 pages per hour, this being a conservative estimate allowing time for review and other "overhead." The educational psychology classes meet five days a week for eleven weeks. If five days are allowed for examinations, holidays and accidents, a total of ten weeks or 50 lesson days is left. If only one hour of study per lesson is assumed, then at 20 pages per hour this gives a total reading load of 1,000 pages. It was felt that this should be a minimum, and that it was not beyond the capacity of the average student.

A second investigation had to do with actual trial of such a scheme. During the autumn quarter three sections in educational psychology and two sections in elementary psychology were actually required to read 1,000 pages per quarter. Careful inquiry brought out no complaint of the reading load, except from two or three failing students; the students appeared to be averaging about 45 minutes per day in preparation—an amount of work which is surely not excessive. In other words, a thousand page reading load appeared entirely practicable for a five hour quarter course. Such a load has in consequence been unanimously agreed upon by the instructors in educational psychology. This is the equivalent of two 300 page books besides the text. It is believed that this load can, later, gradually be increased.[2]

[2] When a program of supplementary reading such as has been suggested is considered, the question at once arises as to methods of checking upon such reading. A variety of methods are in use. Most commonly students are required to turn in special written reports on the readings; occasionally they may be asked to keep notebooks and turn these in as evidence that the reading has been done. It should be realized, however (though many college instructors seem curiously naïve in this matter), that students can hire themes written, that fraternities usually have an accumulation of topics and notebooks available for the aid of their members—that, in short, reports done outside of class are not an adequate way of checking upon reading, in large classes. Further, if the outside reading figures only in a report, even a conscientious student is all too likely to transfer the contents of the reading merely to his paper, not to his memory; there is little "learning with intent to remember." Finally, there is (the writer is convinced) too much time wasted in mere clerical labor in the

The writers fully realize (as was mentioned in the note above) that this determination is only rough, and they also appreciate that requirements in different courses must vary with the difficulty of the material read.[3] But it *is* desirable, they feel, that the proper reading load be determined as systematically as possible. Certainly loads differ from one course to another. And the tendency seems to be toward too light a load.

Regarding Current Methods in College Teaching, and Their Improvement

In the effort to improve methods it was decided to go straight to the students, although their judgments are doubtless immature, and prejudiced toward the easy and superficially interesting, for after all they are the persons chiefly concerned. To obtain the information desired 125 students, in the course in educational psychology, were required to fill out a questionnaire regarding (1) the best course, and (2) the worst course thus far taken in college. The questionnaire was searching and covered in detail assignments, textbooks, "outside" reading, notes and so on.[4]

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average university course—too much perfunctory pushing of the pen on the part of the student to produce something which he knows can receive only perfunctory attention from the instructor, too much reading by the instructor of stuff not worth reading but which he cannot take the time to help the student make better. As usually handled in large classes the special report appears to be, usually, a very clumsy educational device; not infrequently the special topic figures as little more than a bit of "busy work." In order to deal with these difficulties the reading in educational psychology is being covered by quizzes—and largely of the objective type. This problem is being further worked upon.

[3] Other factors also operate. The writers feel that there is much in educational psychology which does not deserve close and detailed study—better wide reading for methods and points of view. In the older sciences the situation is, of course, different.

[4] For example, the first section of the questionnaire ran as follows:

A. Concerning assignments:
- (1) How often were assignments in the text made?.....
- (2) How many assignments in outside reading did you have during the quarter?.....
- (3) Did you have short daily assignments, aside from reading in the text?
- (4) Were the assignments in the text explained so you knew what questions to keep in mind as you were reading?.....
- (5) Were the outside reading assignments explained?.....
- (6) Were you held rigidly responsible for all assignments?..... .....
- (7) In what way?.....
- (8) How often was your preparation of assignments tested?.....
- (9) About how much time was necessary to prepare the average assignments in the text?.....
- (10) How often were you sent to the library during the quarter?..... .....

Space was, of course, left for answers, on the questionnaire blank. The other main headings of the questionnaire are indicated in the summary given in the text.

In handling results the percentages, of the good and of the poor courses, showing a given characteristic were found. And those features were considered significant which were at least 10 percent more common in the good courses than in the poor courses. The following table shows these distinctive characteristics of good courses. Those items starred were at least 20 percent differential and thus most significant of all.[5]

TABLE I

DISTINCTIVE CHARACTERISTICS OF GOOD COURSES

(Items more than 10 percent differential; points 20 percent or more differential are starred)

I. Concerning the assignment.
*(a) Assignments explained. (b) Class held responsible for all assignments. (c) Reasonable amount of time (one and one quarter hours) demanded for preparation.

II. Concerning the text.
(a) Weekly quiz on text. (b) Easy text. *(c) Interesting text. (d) Explanations in text adequate.

III. Concerning outside reading.
(a) Reading checked in some way. (b) Reading could not be done for you. *(c) Reading interesting. (d) Choice of topic.

IV. Concerning notes.
(a) Notes not inspected. (b) Lectures could be outlined.

V. Concerning the conduct of the class.
(a) Mechanics of presentation.
(1) class starts on time. (2) class closes on time. (3) instructor can be heard. (4) good discipline maintained. (5) all members of the class called on evenly.
(b) Instructor's preparation.
(1) knew material thoroughly. (2) did not seem to run out of material. (3) was thoroughly prepared.
(c) Instructor's manner and personality.
(1) is not sarcastic. (2) shows no partiality. (3) makes work interesting. *(4) does not make pupils afraid to ask questions.
(d) Method of presentation.
(1) little lecturing. *(2) much discussion by students. *(3) outline used. *(4) outline clear. *(5) outline followed. *(6) frequent summaries. *(7) frequent demonstrations. *(8) applications made to present day problems. *(9) instructor lets pupils know exact standing at all times. *(10) instructor tries to discover the individual needs of pupils.

VI. Concerning written work.
*(a) Gave review recitations before examinations. (b) Announced examinations at least a week beforehand. *(c) Examinations fair. *(d) Same things called for on examination that were emphasized in class. (e) Did not use "true-false" questions, but did use other objective types of examinations. (f) Returned papers promptly. (g) Called for a term paper on some topic.

[5] Thus in 36 percent of the poor classes assignments were explained and in 60 percent of the good classes, giving a net percent of 24 in favor of the good classes. So "assignments were explained" is starred in the summary. "Class held responsible for all assignments" was 17 percent more common in good courses than in the poor courses; so it is included but not starred.

On the basis of the above findings the following three requirements regarding procedure in college teaching were suggested, as vital for efficient teaching, and covering points often neglected:

1. The material of the course must be thoroughly, unmistakably, unescapably, organized. (a) The course must have a simple, clear outline. (b) This outline must be followed by the instructor. (c) After the completion of each major division of the course there should be a brief review, at which time the instructor should give opportunity for clearing up difficulties and should emphasize important points and give perspective.

2. The instructor must, throughout the course, know what his students are doing. (a) Students must be held responsible for all assignments. (b) The work of the course and the examinations or reports upon that work should be so distributed that by the middle of the quarter each student can be given a reliable statement of standing to date—a statement based upon adequate information regarding what the student has done in approximately one-half of the work of the quarter.

3. When assigning advance work the instructor should explain new terms or methods, indicate important points, and should prepare the class for this work. A mere request that the next chapter be read should never be considered sufficient. The college instructor should realize that the method of assigning the advance work may contribute quite as much as the method of handling the work of the day, in making teaching successful.

After going over the findings mentioned above, the instructors in educational psychology unanimously and heartily agreed upon these rules, as procedures to be followed in giving the course.

Again the data may not be considered as adequate as could be desired. The student's judgments may be based on superficial and secondary factors;[6] the desire of the students for interesting reading may be a case in point (though against the notion that laziness is the college student's dominant characteristic, it is worth noting that one of the common suggestions for improving the poorer courses was "more outside reading"). But most of the findings appeal to one as distinctly valuable. Certainly methods of college teaching should be systematically investigated in some way—presumably in every way practicable.

Results of Application of the Above Findings, in a Large Required Course

As already indicated, the findings reported in the two previous sections were at once applied in conduct of the first course in edu-

[6] It is worth mentioning in this connection that the marks the students obtained in their "good" courses averaged only slightly higher than grades in their "poor" courses.

cational psychology. A carefully organized set of readings, totaling around 1,000 pages, was worked out.[7] A carefully systematized outline of the course was developed, mimeographed, and put in the hands of the students. Schemes of frequent quizzes and systematic procedures in assignment were agreed upon. The question then was —how might the results of these changes be followed and their value determined? Especially, information was desired as to the general attitude of the students toward these changes.

A general effort on the part of the instructors to obtain expressions of opinion on the matter from the students led to the conclusion that the revised course was being received favorably—in fact, often enthusiastically. But students' remarks to instructors, on such a topic, are not always so frank as might be. The question was this: Was there not something the students *did,* the doing of which would serve as a measure of their approval of the course?

If the course were an elective course the size of the enrollments, in succeeding quarters, might be considered in the nature of a vote on the matter.[8] This course was however, required in the college of education and a general elective in no college; enrollment was thus a product of circumstances largely independent of the course itself.

The course was, however, *the* prerequisite to all other, elective courses in the general field of educational psychology. The question then was this: Could not the "holding power" of this course—the extent to which it influenced students to take further courses in this field—be used as an indication of student attitudes toward the changes above mentioned?

As a matter of fact an exact statement of the holding power for any given quarter would be difficult to work out. However, with the quarter system it seemed reasonably adequate for the purposes of this study simply to find the percent each year which the total enrollment in the advanced courses was of enrollment in the first course in educational psychology. The percents run as follows:

TABLE II

College year	1922–3	1923–4	1924–5	1925–6
Percent	33	47	48	79

[7] The effort was to include not only text-book material but also reports of specific investigations, to give the students a more concrete and vivid understanding of the subject. Material was selected from some eight different authors, to give different points of view.

[8] Not that enrollment can be taken uncritically as a measure of the worth of a course (though college and university administrators seem often inclined to do just that); the "cinch" course, in which enrollment is purchased by the vicious expedient of a virtual abandonment of standards of work, is an academic by-word. But if increased enrollment should come with an *increased* reading load, and more quizzes—that would be very different.

It is evident that over the period during which these changes in the prerequisite course were being made the proportion of students going into advanced work markedly increased.

Various factors might conceivably operate to produce this result. Increase in the number of advanced courses might so operate. The facts are, however, that only three new courses were offered in this field during this period, and that the average size of the advanced classes increased just 100 percent during this time. The advanced courses were also improved in the light of these same investigations. However, the major changes were in the first course. The gross fact seems to be that a marked gain, in the proportion of students going on to advanced courses in this field, was the result of a teaching policy which was characterized most strikingly by an increase in reading load, and an increase in the number of examinations and raising of standards.

Summary

The paper reports attempts to attack, by simple research methods, two immediate and important problems in college teaching.

(1) Some data were obtained suggesting that reading load in college classes was often much too light, and indicating that 1,000 pages of reading for a five-hour quarter course in educational psychology was not too heavy.

(2) The distinctive characteristics of good as compared with poor college courses (as judged by the student) were found, and certain rules for efficient college teaching developed on the basis of these findings.

(3) As a consequence of the above findings, certain changes (involving an increased reading load and more complete check on work) were made in a required course in educational psychology. It was found that—apparently chiefly as a result of these changes—the proportion of students taking this course who elected to take further courses, in this general field, more than doubled.

It is concluded that problems of college teaching can be readily and profitably investigated by simple research methods, that it is high time colleges and universities undertook to apply scientific method to their work, and that the student body can be trusted to give material of great value in dealing with such problems if inquiries are properly formulated.

XVI

CONCERNING THE BURDEN OF DETAIL IN CERTAIN TEXT BOOKS

S. L. Pressey

In spite of much agitation to the contrary it is still true that the text book is a common medium of instruction in college, and the most convenient and most adequate single statement of content and arrangement of material in the average college course. It would seem natural, therefore, in considering problems of teaching, to make some study of college text books as they may function as aids—or sources of difficulty—in college instruction. The following three brief studies touch upon only one phase of the text book problem, and they give little more than a glimpse of possibilities in the way of college text book study, but they indicate certain problems.[1] These problems are, the writer believes, rather more serious than might at first be realized. All too often even the college student becomes lost in the mass of detail which certain text books insist upon putting before him; or finding so much that is unimportant, he loses faith in the worth of all the material with which he is asked to become familiar. But the situation will be understood better after some of the findings have been considered.

The Factual Load of a Text in English Literature

The method used in dealing with this topic was very simple and straight-forward. Those coöperating in the investigation simply read the book (a total of a little under 600 pages) very carefully, listing the names of all authors mentioned, all historical or literary compositions, all places and all dates. The work was done chapter by chapter. Whenever a person, title, place, or date was mentioned more than once a tabulation mark was made in the proper place on the list. The mentions for the entire book were then alphabetized, the times mentioned being combined so that the final table showed, for each type of matter dealt with, the items appearing in the volume

[1] The reader will doubtless realize, as he goes over these bits of data, that the general problem with which they deal is a problem of college instruction even where no text book is used. That is, where no text book is employed, extensive readings in the library usually figure instead, and the burden of detail is even greater than here suggested.

and the number of times that each item appeared in each chapter. The complete tables show 2618 times[2] that authors' names appear, 910 mentions of historical or literary characters,[3] 1814 mentions of titles, 1231 of places, and 1345 of dates, or a total of 7918 such items. The next question was as to the number of *different* persons, titles, dates, or places appearing, and the frequency of their appearance. The following table summarizes the situation:

TABLE III

FREQUENCY OF MENTIONS OF VARIOUS ITEMS OF INFORMATION IN A TEXT IN ENGLISH LITERATURE

Frequency	Authors	Hist. & Lit. characters	Titles	Places	Dates	Total
25+	29	1	3	6		39
20–24	7	2		3		12
15–19	8	1	1	4	1	15
10–14	12	7	8	7	16	50
9	9	5	3		7	24
8	11	2	6	1	11	31
7	9	6	6	3	13	37
6	9	10	14	8	29	70
5	20	6	19	12	27	84
4	15	12	29	13	38	107
3	24	31	82	27	47	211
2	31	65	135	61	84	376
1	101	257	685	218	144	1405
Total	285	405	991	363	417	2461
Percent once	35	63	69	60	35	57

It will be seen that this volume included mention of 690 different persons (authors and characters), 991 different literary works, 363 different places and 417 different dates, or a total of 2461 different items. It will also be noted that for the entire table over one-half of the 2461 items appear only once. One cannot but wonder whether items mentioned only once are all of such significance that they must be included.

Table IV comes at this matter of comparative importance of items from a somewhat different angle. It shows the number of items which are mentioned in more than one chapter. The argument is that an author, character, place, or date of distinct significance is likely to be mentioned in more than one connection or re-

[2] These figures include repetitions of the same name or title.

[3] No distinction was made because in many instances such distinction was found very difficult. It was not clear for instance whether, in the history of English literature, Anthony should be considered a historical or literary character primarily.

ferred back or forward to. It will be seen that 77 percent of the items are mentioned only in one chapter. The suggestion is certainly that the remaining 23 percent of the items are probably of sufficient importance to receive some stress—and perhaps that some of the 77 percent might be omitted.

TABLE IV

NUMBER OF CHAPTERS IN WHICH THE VARIOUS ITEMS APPEAR

No. of chapters	Authors	Hist. & Lit. characters	Places	Dates	Total
6+	9	2	11		22
5	9	1	4	1	15
4	6		6	1	13
3	13	16	15	17	61
2	39	30	38	125	232
1	209	356	289	273	1127
Total	285	405	363	417	1470
Percent one chapter	73	88	80	65	77

One more thing was done, in an effort at comparative evaluation of items. Another text in literature was gone over, with reference to dates, and comparison made with the similar results of the first book. A total of 378 dates were mentioned in the second book, as compared with 417 in the first. In all, there were 307 dates appearing in both books, and 181 which were mentioned in only one volume. That these last dates were for the most part not considered very important even by the author mentioning them is indicated by the fact that 109 (60 percent) of them were referred to by that author only once. Again one is left with the feeling that certain dates might well have been omitted. At the other extreme there are 82 dates which, when the frequencies for the two books were averaged, showed five or more appearances. In the importance of these dates one can have some confidence.

CHARACTERS IN HISTORY[4]

Presumably one objective in the teaching of history should be a bringing of the students into acquaintance with the characters figuring in historical events. Both the personalities of these individuals and their accomplishments would seem important matters. Such material should be valuable for the understanding of historical de-

[4] The writer wishes to express his obligation to Miss Geneva Johnson for her careful work upon the material presented in this section.

velopment. It should also be valuable for its own sake; these personages would seem well worth knowing, and some acquaintance with them an important contribution toward a liberalizing education and an understanding of human nature. The question dealt with in this investigation was this: To what extent does a college text in American history give adequate understanding of the characters mentioned, and their doings? The method consisted simply in reading over the book, noting the number of lines given to (a) characterization of each individual mentioned, and to (b) a description of what he did.

It should be observed in the first place that a total of 983 different characters appear in the book. The number of times each character is mentioned is indicated in the following table.

TABLE V

No. of mentions	1	2	3	4	5	6	7	8	9	Total
No. of Characters	814	113	24	18	5	1	4	1	3	983

This table shows that, of the 983 different persons mentioned in this book, 814 (about five-sixths) were mentioned only once, 113 were mentioned twice, and so on.

Now as to the amount of space actually given to a characterization of these 983 individuals. The following table shows the situation.

TABLE VI

No. of Lines	0	1	2	3	4	5	6	7	Total
No. of Persons	841	80	29	14	8	3	5	3	983

This table shows that 841 (about six-sevenths) of these persons received less than one line of characterization. As a matter of fact most of them were not characterized or described at all; they were simply names. Some received a single descriptive adjective. Only 62 persons received more than one line of description—it would seem that more than one line would be necessary to make a historical personage really an individual to the reader. Only twelve persons had five lines or more given to them, as persons.

Next as to the amounts of space telling what these various individuals did. To determine this was of course difficult, since most of them did not do things in isolation, so to speak; their acts are mentioned as part of some undertaking in which others also participated. It is probable that the figures below rather over- than under-estimate the space given to each person's doings. The find-

ings were as follows (the progressively heavier grouping of the table should be noted):

TABLE VII

Lines:	0	1–2	3–4	5–6	7–8	9–10	11–15	16–20	21–30	31–40	41 and over	Total
Cases:	541	69	63	48	41	56	52	42	32	16	23	983

This situation seems better; there are 23 individuals to whose acts 41 lines or more are devoted. It is to be noted, however, that over half (55 percent) of these people have less than a line devoted to their doings. The man's name is given, the fact mentioned that he was governor of some colony, commanded an army corps in some battle, signed some treaty, was on some committee, nominated for vice-president. It would surely seem not unreasonable to conclude that, for the average student, a majority of the individuals who are mentioned in this book will be simply marionettes who appear once, make their one small contribution of act or word or circumstance, and are immediately lost again in that inchoate mass of detail which (for so many students) is history.

The Vocabulary Burden of a Beginning Text in Zoology

Casual inspection had shown a college text in zoology commonly used in beginning courses in that subject to contain a great many technical terms. Contact with students had made clear that in such courses technical terms constitute no small element of difficulty. And conversation with college teachers had indicated that many of them do not recognize the full extent of this burden. The text in zoology above mentioned was, therefore, gone over by a very careful and intelligent student, who had taken several courses in zoology, and all words listed which seemed to her of a technical nature. The total list was then alphabetized and, as a rough but definite and objective measure of the technicality and difficulty of these words, every term was looked up in the Thorndike list of the 10,000 most common words of the English language,[5] and all terms there appearing crossed out. The number of words thus shown to be outside the most common 10,000 was 4,226.

Is this too large a number? Teachers of foreign languages appear to consider the acquirement of a vocabulary of one thousand words a fair achievement, for the first year of study of a foreign language. The Classical League suggests a thoroughly mastered

[5] Thorndike, E. L., *The Teacher's Word Book*, Teachers College, Bureau of Publications.

vocabulary of 400 to 500 words for the first year of Latin, and reports total number of different words in beginning books as around 1500. Inspection of the above mentioned list of four thousand technical terms shows most of them to be so technical and difficult as to make reasonable the inference that the great majority are probably quite as new to the beginning student in zoology as French or Latin terms are to a beginning student in one of these languages. On the face of it the situation appears to be this, that this first text in zoology requires, as incidental to the mastery of a difficult subject-matter, the acquirement of a vocabulary about four times as big as the vocabulary ordinarily required in the first year of a foreign language. Even if generous deductions be made for terms already met (as in courses in hygiene or high-school general science), and the vocabulary estimates for a first year language course be considered too small, the conclusion that this first text in zoology involves a vocabulary about twice as large as appears in the usual beginning language course would hardly seem exaggerated.[6]

Discussion

Certain college textbooks thus include an amount of detail—items of information of various sorts, special terminology—which, when systematically enumerated, totals to no small figure. Is it to be concluded that the detail is excessive? Evidently the data are not such as to warrant any answer to this question;[7] some evidence *was* obtained, however, to suggest that these items differed greatly in importance. At least this conclusion would seem justified, that college text books can with profit be investigated. It is the importance of such investigation which the writer wishes to emphasize.

[6] As a matter of fact the unfamiliarity of most of these terms is not adequately indicated by their being outside the most common ten thousand words of the language. Most of them are probably outside of the most common twenty thousand. And though some of these terms may have been previously met it must be remembered that the first year vocabulary in French or Latin contains many words which, because of close similarity to an English equivalent, can hardly be considered entirely new to the student. It must also be mentioned that the method used in locating technical terms, listing by a single reader of terms which seemed to her technical, undoubtedly omitted some terms. All in all, the above conclusion would seem conservative rather than otherwise.

[7] The situation is very complex. Thus some of the items catalogued in the histories are undoubtedly known already by students coming to these courses. Some items are not intended, perhaps, to be specifically remembered, a certain politician's name is intended to function for the student simply as if the author had said, "a politician" did so and so. The text may be intended as a reference book rather than a statement of things to be learned. But the point is that the facts regarding amount of detail should be known. And some definite policy in the matter should be adopted.

College textbooks are now for the most part highly conventionalized as to general purpose, organization, type of matter included, style, and general approach. There should presumably be first a careful consideration as to the function of a textbook in a given college course: will it serve as a major source of material, a reference book supplementary to the lectures, as general guide, as basis for review and organization? There should be careful selection of matter with reference to the needs, and the practical limitations, of the students' capacities and background. The text should be carefully organized with reference to what is known concerning methods of study, individual differences, curricular organization as related to such differences—should be planned with reference to most efficient learning. Textbooks and other instructional materials so developed would probably be very different from books now commonly used in colleges.[8] But such materials might be expected to contribute in no small amount to the rejuvenation of college teaching, to the increase of student efficiency, and the raising of college standards of achievement. The crucial thing, in any movement toward such accomplishments, is the research approach to the textbook problem.

Summary

The paper reports three investigations regarding the amounts of various types of detail in certain textbooks.

1. A text in English literature was found to mention a total of 2461 different items such as authors, historical and literary characters, literary compositions, places, dates. Of these items, 57 percent appeared only once; 77 percent were mentioned in only one chapter; of the dates, 36 percent did not appear at all in a second text in this subject.
2. A college text in American history mentioned 983 different persons (83 percent of them appearing only once), but a majority of these were described or characterized not at all, and had less than a line devoted to a statement of what they did.
3. A beginning college text in zoology was found to involve a technical vocabulary at least twice as great as the vocabulary in a first year language course.
4. It is urged that research study of college textbooks is highly desirable.

[8] The self-instructional material in statistics mentioned in a previous paper may be taken as an example.

XVII

A UNIVERSITY "EXPERIMENTAL CLASS"

LUELLA COLE PRESSEY

THE SITUATION

One of the writer's classes in the autumn of 1924 was a large section, 71 students, in the first quarter of a two quarter course in elementary psychology. The topics to be taken up were specified in an outline which had been agreed upon by the instructors handling the various sections. The time available was very definitely stated by the catalog; the class met five days a week for fifty minutes. The teaching method which seemed tacitly agreed upon by those giving the course was of the conventional college type, informal lecture with occasional question or comment from the more alert or forward students. With such a large section, and such definite limits as to topic, time, and teaching precedent, the sensible thing might seem to be a continuance in the usual procedures.

The writer was, however, very dissatisfied with the conventional methods of college teaching. They seemed all too often to stifle what interest the students might bring to a course. They appeared to give slight opportunity for initiative and original thinking, to hinder rather than to foster the development of skill and courage in attack upon new problems. They certainly did nothing to bring about among the students that comradeship and free intercourse in intellectual activity which presumably should be one of the finest features of university life. The question was this: Was it possible, operating within the set limits as to time and topics above mentioned, and with the large group with which the writer was faced, to introduce procedures which would make possible the realization of some of the values above indicated? This paper is a description of an effort to do this thing, and the results.

THE EXPERIMENT

The writer wished to suggest problems rather than present facts, and to bring it about that the students themselves discovered the solutions to these problems. So far as possible she wished to give the class not only topics to discuss and read about, but things to do. Especially she hoped to force the students from the passivity, re-

pression, and fundamentally unsocial method of the usual college class and get them to working and talking freely together about the matter of the course; to make progress in the course a coöperative and essentially social affair. The procedure finally adopted was as follows:

On Monday of each week a lecture was given introducing the students to some new phase of subject matter and preparing them for the problems to be worked out during the week. So far as possible the conclusions of previous work were not mentioned; the instructor simply outlined the topic for consideration and indicated what questions there were that needed to be answered. On the next three days the class worked on the problems suggested by the topic. Some of these were done in class, in fact the whole class hour was turned into a sort of laboratory, while some were merely started in class and then finished at home. On Friday there was a very informal recitation period (before which all reports on problems had to be handed in) and a general summarizing of the discoveries and discussions of the week.[1] There was, for Friday, an assignment in the text covering the week's work.

The problems used were constructed so as to give the students the maximum opportunity to use their own experiences and to discover facts for themselves. In the work on vision, for instance, the laws of color mixing were discovered by the students. Previous to the class hour nothing had been said about complementary colors; the students discovered, however, that certain colors gave grey instead of a third color, and found out for themselves what these colors were and mapped out the general situation. For topics not readily involving experimentation the effort was to set the general problem so as to refer the students to their own experiences and provide material for discussion among them. Thus one problem of this type read as follows:

> Describe five bits of behavior you have observed among animals. For each incident tell what was the stimulus and of what the response consisted. How did you interpret the animal's behavior? Did you read any of your own motives into it? To what extent could you judge why the animal made the response he did from simply observing him? Why do you have to limit your investigations to behavior, in the case of animals? What are the dangers, in interpreting behavior?

On some of the problems the students naturally, for the most part, worked alone. At other times they worked in pairs (selecting their

[1] That it was informal and involved student participation was shown by timing, by an assistant, to determine time actually taken by students. They were found to be using 45 percent to 70 percent of the hour.

own partners) or in small groups for each of which instructor appointed a capable and popular student as "leader." There were enough problems each week so that no one ran out of work, but the more vital problems were placed first so that everyone completed the "minimum essentials."

This total group of 71 students thus was, during the three middle days of the week, engaged in work of a problem-solving nature and much of the time in real activities of a simple experimental type. The most striking innovation, however, was in the relation of the students to each other, and to the instructor, which was developed. The students were *encouraged* to talk to each other, to move about when they wished, to feel that they were without restraint except as the group itself might require coöperation (and it was pitiful to observe how hard it was, at first, for these young men and women to realize that they were thus freed from the repression and passivity of the average class). Further, the instructor merged herself in the total group, functioning not as police officer, nor as teacher in the usual sense, but as a helpful coöperator in the various undertakings.[2]

The writer used several devices to keep her in touch with the work of each student. On Friday she called for reports on certain experiments, though not on all (since the students did not know which would be asked for they had to have all of them in readiness.) Sometimes no reports were handed in, but the students were given

[2] The writer can hear comments to the effect that the classroom on Tuesday, Wednesday, and Thursday must have been disorderly. To the traditional teacher, it was. The writer doubts if 71 able-bodied individuals can really work without making more or less noise. It has been her experience that silence from a class denotes, not profound attention, but mental stagnation. It was evident that the students were busy; there was very little indeed of irrelevant conversation or disturbance. But there was much going on, and much talk. At any particular moment during the study of vision, for instance, there were likely to be four or five pairs of students at the blackboard working out fields of color vision, eight or ten students grouped around a color-mixer, arguing with the leader and each other, three or four in a group examining various models of the eye, ten in their seats working on individual problems, one or two walking to or from the main desks to get or return materials, three students arguing with the instructor, two students who had finished most of the problems helping some of the weaker students, a student at each dictionary, two pairs of students testing each other's visual reflexes, six lads earnestly making color charts, four more grouped around the color pyramid arguing whether brown was a dull orange or was not on the pyramid at all, two students thoughtfully staring at one forefinger while they moved the other in and out of their blind spot, three boys sitting with their chairs turned toward the wall so they could work with less distraction, five girls grouped around the main desk trying to decide what to call the after-image from an olive-green, and two or three more wandering out of the room in pursuit of a drink! A disorderly class, yes, but a class in which everyone was actively engaged in learning something.

ten or fifteen minutes of written work based on the problems. Each student kept his work in a large envelope in a case in the classroom. These envelopes were raided at irregular intervals to get an idea of what each student was doing. The instructor was able, as she mingled with the various groups, observed the way the different students went at things, talked with them and heard their discussions with each other, to obtain insights into the abilities, personalities, and progress of the members of the class which could never have been obtained by a more formal method; and to assist those needing help far more intelligently and more readily, than in the usual class.

The Results

And now as to results. Certain outcomes were somewhat intangible perhaps, but could be observed. The students developed the problem attitude rather than the blotting-paper attitude, toward their work. They learned something of methods for efficient problem-solving, of selected and critical as contrasted with indiscriminate and unquestioning use of textbook and other reading, of orderly and business-like procedure in experiments; and they obtained some appreciation of the experimental point of view. However, most striking to the observer was this, that these naturally social adolescents were joyously coöperating in their work—not working under an attitude which regarded coöperation as unethical. And there had been developed a morale which brought group control of the individual (rather than instructor-policing), and made the total group into a harmonious and vital class-room community.

Some statement of the attitude of the class was desired. To obtain this, near the end of the quarter one of the other instructors met the class, and asked the students to answer the following questions (they were told that their answers were to be either "yes" or "no," that they need not sign their names, and that all answers would be tabulated in class and the papers destroyed there):

TABLE VIII

	Percent Yes	Percent No
1. Is this course easier than a lecture course would be?	48	52
2. Is this course more interesting than a lecture course?	93	7
3. Do you cover more ground than you would in a lecture course?	21	79
4. Do you learn what you cover more thoroughly than in a lecture course?	91	9
5. Has the work been better adapted to your individual capacities than in a lecture course?	85	15
6. Has the work been more systematic than it would have been in a lecture course?	11	89
7. In general, do you wish the course had been presented in lectures?	8	92

One further piece of evidence was obtained. During the next quarter an investigation was made as to the number of students from this elementary section now taking a further course in psychology (aside from those who were required by the curriculum of their college to take another quarter) as compared with the number of students thus immediately electing further work in the department from the sections of previous years and also from sections taught by other instructors. In both comparisons the figures come out very definitely in favor of the experimental class. There was a gain in "holding power" of about 15 percent over instructors (including the writer) who used a combined lecture and discussion method, and a gain of more than 25 percent over sections taught by a straight lecture method. Over the writer's own previous sections the gain was 16 percent.

The Important Conclusions

The immediate outcomes of the experiment may then be considered reasonably satisfactory. But certain general conclusions were to the writer much more important. The experiment clearly demonstrated that even with a large class of college students the formal lecture method can be avoided. It was demonstrated that methods of the informal project-problem type are possible (and effective) in large college groups. Most important of all, the experiment shows that not only grade school children in experimental schools but also college men and women can be brought to carry on such projects as coöperative and socialized affairs. The writer feels that there is here the suggestion of a possible approach to the college "teaching" problem which is distinctly unusual, but has much to justify it as regards educational theory, and great promise.

In fact, there is raised this somewhat startling question: Cannot college students best be brought to learn by some other method than by teaching them? That present discussions of problems of higher education center upon ways of improving teaching seems, to the writer, in certain respects unfortunate. The function of the college faculty is *not* to teach; the task of the faculty is to bring it about that the students learn—and more largely, that they attain the finest possible intellectual development. Now everything known about the learning process indicates that to tell a student about a thing is not the best way to cause him to learn it; surely, intellectual development is not best brought about that way. What the colleges need most is not instructors who will handle the conventional teaching procedures a little more cleverly and interestingly. The need is for *educational engineers*—persons who will be expert

in setting up situations in which learning activities, and intellectual development, will naturally come about. In such situations teaching, in any of the usual meanings of that word, may play a relatively small part.

One more point. Whether this particular experiment had come out well or not, it was worth while—something different was tried, and an effort was made to determine the value of this new thing. In short, the undertaking had at least this merit, that it was an experiment.[3] The writer believes it would be well if every large college department made it a regular practice to have an experimental class or section. At least such a practice would bring about some consideration of the possibility of other than the conventional class-room procedures; and it would develop an experimental attitude toward college problems. That normal schools and colleges of education should have such classes would seem almost demanded by consistency. They have experimental schools for trial of new ideas in work with children. Why should not these institutions take the same attitude toward their own work? Might it not be highly valuable for both their instructors *and* their students to participate in such undertakings?

Summary

1. The paper describes an effort, in handling a class of 71 college students, to break away as completely as possible from both lecture and recitation methods, and develop a socialized procedure.

2. An informal laboratory-project method was used, for this entire group of 71 students. Further, this entire group was given almost entire freedom to develop the work in coöperative and socialized fashion; there was freedom of movement about the room, and discussion among the students was encouraged.

3. The students appeared to gain in ability to think for themselves and work efficiently. The direct testimony of the students regarding the course was favorable. A greater proportion elected further work in the department than from other sections taught by the usual methods.

4. It is urged that the experiment suggests a somewhat new approach to the problem of "instructional" method in higher education.

5. It is also urged that every college and normal school should have "experimental classes" for the trial of new ideas.

[3] Unfortunately, many so-called educational experiments are not true experiments, in that they do not include any systematic efforts to determine values. They are rather (to use a business term) highly speculative undertakings.

XVIII

CONCERNING PROFESSIONAL TRAINING FOR COLLEGE TEACHERS

S. L. PRESSEY*

It is now becoming common practice to attempt analyses of various types of work, and construct schemes of training specifically arranged to prepare for these "jobs." That is, the effort is to make the training prepare, with some definiteness, for the work the individual will shortly be called upon to do. The present paper reports a first consideration of the usual graduate school program of work for the doctorate, from this general point of view.

Two things were done. In the first place, the yearbook of the American Psychological Association was studied with reference to the activities of its members. In the second place, an inquiry form was sent out to three groups: (a) to members of the American Psychological Association who had received their doctor's degree five years ago or less, (b) to members of the Psychological Association who had received their doctor's degree fifteen years or more ago, and (c) to members of the Educational Research Association (an organization made up of specialists in educational research). The inquiry form was as follows:

It need hardly be said, in view of the contents of the following few brief paragraphs, that the writers have in mind the possible desirability of fundamental revisions of present programs of graduate study. They are very anxious to obtain your reaction in this connection to the few brief points covered. The point of view is obviously that training should take account of future professional needs—but further explanation is unnecessary. There is only this much to be added; that the writers appreciate the abominable nuisance of questionnaires, and have very carefully figured this less-than-a-page of matter on the basis that the whole thing can be done in under five minutes of time. They beg consideration of the first paragraph in particular.

1. Check each of the following subjects which you consider might profitably be added or substituted in the list of required work for the doctorate (it is believed entirely feasible that certain of these "professional" subjects should be given in a month or six weeks course, the traditional semester or quarter not being necessarily the only unit which might be used for graduate instruction):

* The writer wishes to express his obligation to Mr. F. Herrick Conners for assistance in this investigation.

(a) Methods and Problems of College and University Teaching.....
(b) Utilization of Scientific Literature and Periodicals.....
(c) History of Higher Education.....
(d) Methods in Scientific Writing.....
(e) Philosophy and Problems of Higher Education.....
(f) Methods and Problems of College and University Administration.....
(g) Elements of Statistics.....
(h) Principles of Scientific Method.....
(i) Any other elements which you believe desirable.....
.....

2. During the past year roughly how many pages of material have you read printed in the foreign languages required of you for your advanced degree?....

3. In your present position roughly what percent of your time do you devote to: (a) Teaching?..... (b) Research?..... (c) Administrative work?..... (d) Other Duties?.....

4. (a) Do you believe that the present requirements for the doctorate of philosophy are satisfactory?..... (b) Any comments or suggestions relative to the situation?... .....

In the American Psychological Association a total of 67 of each group were selected by chance, for circularization, including however only those who had the doctor's degree, and essentially the same selective method was used in sending to the 80 members of the Educational Research Association.[1] A total of 214 forms were thus sent out.

What Two Professional Groups Do

The first question was as to the type of work the individuals in the groups studied were doing. The following table shows the analysis of the year book of the American Psychological Association.

In this table the classification is on the basis of type of position occupied. It is clear that over four-fifths of the men are engaged in college or university work. Further, though clinical and industrial positions are on the increase the total effect is slight (at least so far as men are concerned; the rapid increase in number of women obtaining the doctor's degree and the tendency of the women to go into clinical work is of some interest). It seems clear, then, that the doctor's degree in psychology is a degree preparing primarily for college or university positions.

[1] One or two questionnaires were by accident sent to those without the Ph.D., but these were eliminated from the final tables. Other exclusions from the original mailing lists were members of the Ohio State faculty (as having special relationships to the writer) and three university deans and two university presidents.

TABLE IX

OCCUPATIONAL AFFILIATION OF MEMBERS OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION (CLASSIFIED BY YEAR WHEN DEGREE WAS OBTAINED)*

Year	Total	Percent in			
		College	Clinic	Business	Misc.
1916-25	229	79	14	4	3
1906-15	164	88	8	2	2
1896-05	92	86	8	1	5
1886-95	41	95		2	3
	526				

* The grand total omits some 8 cases for whom the date of the final professional degree was not given; the percentages are figured on sub-totals for each ten year group, of those giving some occupational affiliation. The group 1886-95 includes 5 men obtaining the degree in 1884-5.

Two other bits of analyses are of some interest. The percents of women, for the ten year intervals from 1886 on, are 5, 9, 15, 27. The percents of cases obtaining the professional degree abroad were 20, 11, 4, and .4.

The next table (Table X) shows the distribution of time on various types of work, as reported by the three groups circularized in the questionnaire. As will be seen, the major activity in all three groups was reported as teaching. Four-fifths of the older American Psychological Association men replying report some administrative work. Comparison of results of the five year and fifteen year American Psychological Association groups suggests that primarily research positions are opening up more for the younger men (though this may, of course, be a somewhat transitional phase of the professional career through which the older men also went, shortly after receiving the degree).

TABLE X

DISTRIBUTION OF PERCENTS OF WORKING TIME DEVOTED TO TEACHING, RESEARCH, ADMINISTRATION, AND OTHER ACTIVITIES BY (a) PSYCHOLOGISTS WHO COMPLETED THEIR PROFESSIONAL TRAINING NOT MORE THAN 5 YEARS AGO, (b) PSYCHOLOGISTS WHO COMPLETED THEIR PROFESSIONAL TRAINING 15 YEARS OR MORE AGO, AND (c) MEMBERS OF THE EDUCATIONAL RESEARCH ASSOCIATION

Percent	Teaching			Research			Administration			Other Activities		
	5	15	ER	5	15	ER	5	15	ER	5	15	ER
81-100	4	2	3	2		1				1		
61- 80	7	5	6	5				3	1	1		
41- 60	4	10	17	3	1	11		3	2	2		1
21- 40	10	8	11	10	8	14	2	6	5	4	1	7
1- 20	4	2	4	12	13	17	19	10	23	12	11	23
0	6	0	3	3	5	1	14	5	13	15	15	13
Totals	35	27	44	35	27	44	35	27	44	35	27	44
Average	42	50	45	34	18	30	9	26	13	15	6	12

Briefly it may be said that, in psychology and education at least, people with the doctor's degree appear to give definitely more time to teaching than to any other one type of activity; and most of these men, if they remain in university work, come to have some administrative work to do. The proportion of time devoted to research appears to become less among the older men, teaching and administrative work receiving more attention.

Attitude Toward Inclusion of "Professional Work" in The Program for the Doctor's Degree

The next question is naturally as to the attitude of the groups studied toward the inclusion, in a program of work for the doctor's degree, of material specifically planned to fit for the activities indicated above—for college teaching, college administrative work, etc. The following brief table shows the percent, of those replying in each one of the three groups, checking as desirable various suggested courses.

TABLE XI

Percent of Each Group Voting for Each One of the Suggested Courses

	Teach. Meth.	Use of Lit.	Hist. H. Ed.	Sci. Writ.	Prob. H. Ed.	Coll. Admin.	Statistics	Sci. Meth.	Other Topics
5 yr. A.P.A..	62	65	14	79	35	24	92	70	14
15 yr. A.P.A.	68	60	28	60	36	32	68	80	4
Ed. Research	65	71	27	76	33	27	89	76	13
Median.....	65	65	27	76	35	27	89	76	13

It is clear that a majority of the people replying would favor some training specifically with reference to college teaching problems, would favor a systematic training in use of scientific literature, in scientific writing, in statistics, and in scientific method. This favorable attitude toward professional work was something of a surprise to the writer, and seems to him of no little significance.

Use of Foreign Languages

As will be seen (Table XII) the foreign languages are used relatively little by the educational group;[2] and a considerable group of the American Psychological Association make no use of either

[2] One educator replied with delightful candor that his foreign language reading had consisted of about 20 pages, "to find out what they are saying about me over there."

language. The interpretation of these results is, of course, difficult; one might say that the foreign language requirement seemed either hardly warranted *or* not stiff enough to insure such proficiency as would lead to use. But the situation in either case appears not satisfactory. There is also the suggestion here that foreign language requirements might well vary with one's specialty; for the educational group the need seems much less. The matter will be returned to later.

TABLE XII

PERCENT OF EACH GROUP STUDIED REPORTING VARIOUS TOTAL NUMBERS OF PAGES OF THE FOREIGN LANGUAGES READ DURING THE PAST YEAR

	5 yr. A.P.A.	15 yr. A.P.A.	Ed. Res.
Less than 10.....	35	36	69
10 – 99.....	22	16	16
100– 299.....	11	6	9
300– 399.....	16	19	2
1000–5000.....	11	19	2
Over 5000.....	5	4	2
	100	100	100

SUGGESTED CHANGES IN TRAINING OF PH.D. CANDIDATES

The last item of the questionnaire asked for the individual's judgment as to whether or not the present requirements for the Ph.D. were satisfactory, and requested suggestions for improvement in case changes were thought to be needed. Out of the 108 individuals replying 25 failed to respond to the first part of this query and 30 omitted suggestions for improvement. Results for the three groups of cases have therefore been lumped. Of those replying to the question, "Do you consider the present requirements satisfactory?" 51 percent answered with a flat "No," 25 percent with a flat "Yes," and the remaining 24 percent spoke of the situation as not entirely, partly, or only fairly satisfactory.

The suggestions which were made for improvement or modification were, naturally, considerably scattered. However, 28 percent of the replies indicated a desire for less language work—either the abandonment of language requirements altogether, the lessening of the requirements so as to include only one language, or the requiring of languages only in the case of the few candidates whose thesis required a great deal of reading in a foreign tongue. A second suggestion, made by 15 percent of the individuals, was that there should be a closer relation between the training for the degree and the occupations into which the candidates would probably go, with

special emphasis upon the need for professional training in the case of those going into teaching. A third suggestion, offered by 12 percent, was that the candidate needed more freedom, that he should be held accountable for a certain amount of subject matter and certain skills in dealing with subject matter, but be less tied to detailed requirements.

Concerning the Larger Situation

The above few bits of data thus seem to indicate some little interest, on the part of two professional groups, in a better adjustment of graduate school training to professional needs.[3] However, it is not these results, but the general problem of educational policy in our graduate schools, with which this paper is really primarily concerned.

The doctor's degree in this country has had a curious history. Introduced from Germany during the last third of the last century with all the prestige of the German scientific preëminence of that period, there was then naturally little criticism or modification of program or methods, little consideration of their educational soundness or their suitability to American conditions. During the '70's and '80's there was a struggle to prevent degeneracy of the title into an honorary degree; and following that, efforts to standardize and define the requirements appear largely to have absorbed attention for another two decades. As a result of these and other circumstances the program for the doctorate seems to have continued essentially the same throughout the last seventy-five years—throughout a period which has witnessed remarkable changes in educational thinking, striking modifications in educational programs from the elementary school through college, and an extraordinary increase in the number, size, diversity of activities of our institutions for higher education, and in their importance in the total educational scheme of things, and prominence in American life and culture.[4]

The usual program for the doctorate undoubtedly has elements of great merit; thus the thesis might be called the *one* recognition of the value of the project method, above the elementary school level. But it is surely high time that this program was very carefully considered with reference to its place in the total scheme of

[3] They probably indicate more interest than is actually the case, since returns came from only about half of those circularized and the probability is that in general those most sensitive to the problem were the ones who answered.

[4] For data regarding the development (or the lack of it) of the doctor's degree program in this country the reader is referred to a paper by F. Herrick Connors on "The History of the Doctorate of Philosophy" to appear shortly.

American education; the matter appears of no less than critical importance as regards the total educational situation. The graduate school trains our college and university teachers, and thus trains those who should be the educational leaders. If this graduate training is inadequate in program, and especially if it embodies no consideration of current educational problems or training for such educational leadership, the situation may be described as little less than dangerous. It is this total situation, and the importance of awakening the graduate schools to full recognition of the obligations involved in what is at present apparently their main function—the training of college and university teachers—which the writer wishes to emphasize.

Summary

The paper deals with certain possible criticisms of and possible improvements in the usual program of work for the doctor's degree.

(1) It was found that four-fifths of a probably fairly typical group of men having the doctor's degree were in college and university positions; and returns from two Ph.D. groups show the greatest average amount of time to go to teaching, and a considerable amount to college and university administrative work.

(2) Inquiry of a younger and an older group in the American Psychological Association, and of members of the Educational Research Association, showed a majority approval for inclusion of some matter, in the Ph.D. program, dealing with problems of college and university teaching, and for other training directly aiming to prepare the candidate for college or university work.

(3) Large variations appeared in reports regarding use of the foreign languages, with a considerable number reporting no use whatever.

(4) Inquiry as to whether or not the present requirements for the doctor's degree were considered satisfactory showed a fairly general feeling that changes were desirable. Various changes were suggested, especially modification of the language requirement, adaptation of training to future needs, and greater freedom from detailed requirements.

(5) It is pointed out that the program for the doctor's degree has remained essentially the same over a seventy-five year period which has seen extraordinary educational and cultural changes. Since the graduate schools train the educational leaders, the graduate school program should be most carefully considered with reference to its teacher-training function, and its adjustment to current educational problems.

SUMMARY AND DISCUSSION REGARDING PROBLEMS OF TEACHING

It will be noted that the papers in this section are straightforward, and suggest obvious methods of attack upon the total problem of teaching efficiency. In the first place, much improvement can be brought about by the introduction of reasonable business-likeness in teaching method, as suggested in the first article. A systematic and continued effort to deal with a few such elementary points of teaching procedure would, the writer believes, accomplish remarkable things. And there is no reason why there should not be a coöperative program for the improvement of teaching, conducted by the teaching staff of an institution—a program based on research, carried on coöperatively, and put into effect rather because of an appreciation on the part of all concerned of the worth of the suggestions than because of any administrative pressure. Such a program might well include critical evaluation of instructional materials such as is suggested in the paper dealing with textbooks.

In the second place there should be some contacts (there seem now to be practically none) between the best modern thinking concerning educational method and college teaching procedures; and courageous, energetic experiment with new ideas must become common. The third paper illustrates what may be done in the way of introduction of modern concepts regarding student activity, self-direction, and free discussion, in a large college class, and is a fine example of such courage.

In the third place, there must be some direct effort at the training of college teachers. That training need not be extensive (in fact there is not enough material dealing with this subject to make that possible). But there should be enough training to give a professional and scientific attitude toward teaching problems. That attitude is, of course, the fundamental thing.

GENERAL SUMMARY

GENERAL SUMMARY, AND DISCUSSION REGARDING POSSIBLE DEVELOPMENTS FROM THE INTRODUCTION OF SCIENTIFIC METHOD, IN THE STUDY OF PROBLEMS OF HIGHER EDUCATION

It is a curious fact that the scientific spirit has as yet hardly touched higher education. The result is that methods in our colleges and universities are still of the most crude rule-of-thumb type —although education is surely a more difficult, elaborate, and delicate "processing" than was ever carried on in any industrial plant. In consequence there is, as shown in the preceding pages, a blundering and waste of money, energy, and the best years of young peoples' lives, that is appalling. The typical college does not know how to train its students in what it assumes to be their major task, in efficient study; and it has nothing but a mild homeopathic treatment to offer for those who are educationally ill. Its programs are so out of adjustment to student needs that some students "take" courses they can pass before taking, and the average student is found more confused about certain topics at the end of the course than at the beginning. Though the college period is a period of rapid and very important final development of emotional nature and character, the college for the most part exercises little more than a police function in such matters. Entrance requirements neglect almost entirely many elements important as preparation for college work, and stress many non-essentials. College teaching methods often fail in even the elements of efficiency and business-likeness, are usually completely out of touch with the best modern thinking and practice as regards teaching; and programs for the professional training of college teachers are non-existent.

The situation is, however, by no means discouraging; on the contrary, the possibilities for early and rapid improvement are fascinating. The fruits of laborious educational research in the public schools are ready to hand as a basis for educational research in the colleges. College faculties and administrative officers are for the most part men of fine ability and training who can, once they come to understand scientific approach to educational problems, carry forward such work splendidly. The college student body is also a selected group, of sufficient maturity and purpose to coöperate most profitably in any such movement. And there are now striking signs all over the country of rapidly quickening interest on

the part of administrator, teacher, and student in a constructive approach to common problems.

The situation thus seems all set for excitingly rapid developments, very soon. The writer ventures the prophecy that even a ten year period may see higher education in this country essentially modified and remarkably improved in effectiveness. The one great essential prerequisite for such development is research. It is the purpose of this volume to emphasize the need for such research and suggest something of the rapid advances which may be hoped for, once our colleges and universities fully sense the outstanding importance of a consistent research program, in dealing with their problems.